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ADDRESSES.

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Mr. President and Members:—As it would be improper on this occasion to attempt even a mention of the vast number of interesting and instructive ideas and observations connected with the science and practice of medicine, which has been evolved during the past year, I shall present for your attention only some points bearing on

THE RELATION OF MICROÖRGANISMS AND TOXINES TO THE SO-CALLED ZYMOTIC OR INFECTIOUS DISEASES,

and as this subject in its various ramifications is too vast for a detailed consideration, I must of necessity confine myself, in great measure, to a generalization upon the biological and chemical features involved. While laboratory work has done perhaps more than any other branch of science toward clearing up many vexed questions about physiological and pathological activities, yet to be of lasting value and guidance it must agree with general and clinical observations. While this has been the case more often than otherwise, yet there are instances where laboratory observations and clinical data have crossed swords!

Before proceeding to an examination of the topics mentioned, it will be necessary for us to keep in mind the fact, that the organized animal body is composed of, and is under, the operation (the same as other bodies) of the three elements of the Universe, Ether, Energy and Matter, under various forms and methods of combination; to which may be added what is known as "Vital Force," which some scientists regard as "energy of position" from the combustion of food. Also that this fact applies to a condition of *disease* as well as health! For in Somatic death, even, *i. e.*, death of the whole body, there are certain elemental tissues which die first, such as the blood and parenchymatous tissue, while certain other tissues, such as the epithelial, resist for a time, at least, the destructive or resolving power of Kinetic Chemical energy. In fact, the only difference between life and death from a physical point of view, consists of changes in the molecular or atomic arrangements under the direction of chemical, calorific, or electric energies. For *matter* and *energy* are indestructible! As Shelley says, "I change, but I cannot die."

To understand at all, the range of pathology and pathological chemistry,—to which we must undoubtedly look for the solution of many of the problems of the present day, it will be proper to take a brief survey of physiology and animal chemistry, which may be considered the foundation stones of our art.

To sum them up according to Mills, Foster and Kirk, we have

The Proximate Principles, which are:

- Organic
  - Nitrogenous—Proteids.
  - Non-nitrogenous
    - Certain Crystalline bodies.
    - Sugars (Carbo-hydrates),
    - Fats (Hydro-carbons).
- The Inorganic
  - Mineral salts.
  - Water.

The proteids are the chief constituents of living tissues, including the blood and lymph.

The molecule is highly complex, consisting of a great number of atoms, and is formed of the elements C.H.N.O.S. and P., although some chemists think that we are still in ignorance of its exact molecular constitution. The proteids are amorphous and non-diffusible, excepting the peptones. They are soluble in strong acids and alkalies with change of properties and constitution. In general, they are coagulated by alcohol, ether and heat. They may be classified into:

Native Albumins: Egg-albumin, serum-albumin.

Derived Albumins (albuminates): Acid-albumin, alkali-albumin, including syntonin (from muscle), para-peptone, and casein.

Globulins: Globulin, paraglobulin, fibrinogen, myosin, vitellin, globin.

Fibrin: Coagulated proteids.

Peptones: By the decomposition of proteids (albumin) by digestion with pepsin we obtain: Antialbumose, anti-peptone; and with trypsin, hemi-albumose, hemi-peptone, leucin and tyrosin.

By decomposition with acids, we get with hydrochloric acid: antialbumate, antialbumid, hemialbumose and hemipeptone.

And with *sulphuric acid* we get antialbumid, hemialbumose, hemipeptone, leucin and tyrosin, and lardacein (an amyloid substance).

The nitrogenous, non-crystalline bodies allied to proteids are: mucin, chondrin, gelatin (or gluten), elastin, keratin, nuclein, chitin.

Carbo-hydrates (Sugars): Dextrose, maltose, lactose, inosit, dextrin, glycogen, tunicin.

Fats, Fatty Acids, etc.: Formic acid, propionic acid, acetic acid, butyric acid, valerianic acid, caproic acid, capric acid, caprylic acid, laurostearic acid, myristic acid, palmitic acid, stearic acid.

The Oleic (Acrylic) Acid Series: Oleic acid.

The Neutral Fats: Glycerin.

The Glycocholic Acid Series: Glycol.

The Lactic Acids:

Bibasic Acids (Oxalic Acid Series): Oxalic acid, succinic acid.

The complex nitrogenous fats (which are obtained from nerve tissues) such as lecithin, glycerin, phosphoric acid, protagon, neurin, cerebrin.

The Series of Bile Acids, etc.: Cholic (or cholalic) acid, glycocholic acid, taurocholic acid, and cholesterin; which has been said to be the only free alcohol formed in the body.

The Bile Pigments: Bilirubin, biliverdin, choletelin, hydrobilirubin.

The Pigments of Urine: Urobilin, uroerythrin.

The Indigo Series: Indican, indigo, indol, skatol.

The Nitrogenous Metabolites: Urea, urea nitrate, uric acid, creatin, creatinin, allantoin, hypoxanthin (sarkine), xanthin, carmin, guanin, kynurenic acid, glycin, taurin, leucin, asparagin, amido succinamic acid, aspartic acid, glutaminic acid and cystin (an amido-acid).

The Acids of the Benzine, or Aromatic Series: Benzoic acid, hippuric acid, phenol, tyrosin.

In addition, we must include the leucomaines, for the discovery of which we are chiefly indebted to Gautier.

According to Vaughn and Novy there are three groups, which they classify as follows:

The uric acid group, in which they enumerate ten bases. The creatinin group, consisting of seven bases, and a third, undetermined group.

Besides these Brieger, Gautier, Hoppe-Seyler and others, have isolated from animal and vegetable organisms in various states of decomposition, about forty substances called ptomaines, some of which exist, and are formed, at times, in the human economy—especially in the intestinal canal. Now, when we contemplate this vast array of physiological and pathological chemical products of the laboratory of the animal body, some of which are so noxious if retained in certain situations or are deflected from certain courses, we ought not to be surprised at the ease with which that equilibrium of the functions—called Health—may be upset; especially as the so-called civilized human being is not only an artificial animal with artificial impulses, and a great range of volitional power; but is assailed on every side by enemies of a parasitic nature, which, if successful in the "universal struggle," may greatly hinder the molecular and chemical coördination. Many thinkers have maintained that the biological were not distinctive from the chemical processes in Nature; but, although intimately connected, we must recognize the difference between the peculiarly vital character of molecular and blastic changes concerned in cellular movement, growth and development, such as Karyokenesis; and those changes which, from time to time, take place in the *composition* of the proximate principles in the nature of fermentation or oxidation, which are strictly chemical.

We know that certain irritations of a chemical, mechanical, electrical or calorific nature may be transmitted to vessels, so as to produce stasis and inflammation, or, directly to leucocytes, or other cellular elements, so as to induce other changes—degenerations—such as the albuminous, amyloid, waxy, lardaceous, caseous or hyaline. We also recognize that there are various degrees of susceptibility and resistance belonging to different tissues, and at different times under equal provocation, so that the blood, leucocytes, and other cells which under the influence of the nervous system, are the most important agents in carrying on the oxidation and nutrition of the body, may become the agents of tissue destruction. As Armory says, speaking in a general way of the nutrition and formation of healthy tissue: "We may classify these under two principal heads. That of metabolism, which comprises the whole range of transformation under the influence of chemical processes, and by means of which proteid substances undergo their many changes; and that of cell proliferation, by means of which the cells are multiplied." These metabolisms, whether of the constructive or destructive character, are chiefly performed by *functionally active cells.*

Although the question of independent trophic nerve action is still unsettled, we know that the influence of the vaso-motor system over the blood and nutrition is very great; for strong external stimuli, such as shock, etc., will produce changes of a physical character in the blood. Wertheim found that the blood of animals which had suffered severely from extensive burns showed afterwards the presence of foreign bodies—yellowish granules, besides increased fluidity, and disintegration of the red blood corpuscles.

Concerning animal chemistry there is but comparatively little known! However, we have seen from the immense variety of chemical substances already discovered to be results of fermentation, or chemical action and reaction, what the probable changes are! Laboratory experiments by Kolb, Munk, Peterson of New York, Shaw and

others show that electrical energy is capable of producing great chemical transformation and decomposition in organic substances, outside the body. They show also that similar changes, either primarily or secondarily, may be produced in living tissue. These observers have thus carried into the system such substances as iodine, strychnia and quinia, in proof of which, these substances were found in the urine in twelve hours or so afterwards. Zinselli has demonstrated beyond doubt, physiological, chemical, and calorific effects upon living tissues by electrical energy—electrical osmosis—as he called it.

Protoplasm, composed of carbon, hydrogen, oxygen, nitrogen, sulphur and phosphorus, arranged into a very complex molecule, which is "the physical basis of life," as Huxley says, and which is the main substance of all animal and vegetable cells, seems capable of the widest degree of change; by "its universal and constant waste; and its repair by interstitial formation of new matter similar to the old."

"Its power to give rise to new forms similar to the parent ones by a process of division. Its manifestations of periodic change in constitution developing decay and death."

Mills, Foster and other physiologists state that protoplasm is not a single proteid substance, but a mixture of such. It contains often also starch, fat, chlorophyl, etc. The *cell* is composed of protoplasm, nuclein, plasmine and chromatine as Dr. McCallum, of Toronto (who has been investigating nutrition), calls the coloring matter of animal cells. Protoplasm under nerve influence constructs a certain substance which is antecedent to another final product, which is called a ferment. According to Vonjaksch, when fibrin or other proteids are acted upon by pepsin and hydrochloric acid at a proper temperature, etc., the proteid passes through several stages before being finally converted into peptone.

The proteid molecule seems to be split up and the albumoses are the first bodies formed. Kuhne describes a proto-albumose, hetero-albumose, and deutero-albumose. Passing to the blood, which is such an important tissue both in health and disease, and so involved in any consideration of protoplasm, we find its chemical composition to be water, proteids, salines, fats, and extractives. The proteids being known as para-globulin, globulin, serum-albumin and fibrinogen; the principal extractives: urea, creatin, and allied bodies, sugar and lactic acid—the serum containing the alkaline salts. The different corpuscles make up from one-third to one-half the weight of the blood, and of this, the red corpuscles may be said to constitute a greater part. The colorless cells are known to contain, besides protoplasm, peculiar granules, fats, glycogen, lecithin, protagon, and other extractives. One especial interest attaches to the red corpuscles, on account of their containing, organically or intimately combined, iron.

There have been very many interesting studies in relation to the blood and nutrition, of late, which we have not the time to notice. Physiologists have, however, found different actions of globulins, para-globulins and fibrinogen in serum. The behavior of coagulation, and the action of so-called fibrin fermentation is not without interest from a pathological point of view, for we shall probably find, in the future, that in many of the general diseases, characterized by parenchymatous inflammation, such as lobar pneumonia, the disease may be due to this vital process—including chemical changes of local origin and influence; for it must strike every one who gives thought to it, that some of these diseases, at least, affecting organs are not essentially inflammations, but are diseases of the blood, as has been found by my colleague, Dr. Gibbes, in some investigations now being made upon pneumonia. What Virchow terms parenchymatous inflammation, that is, cloudy swelling or parenchymatous degeneration, met with in many febrile diseases,—especially the infectious fevers and septicæmia, and after poisoning by arsenic, phosphorus or strong mineral acids is, probably, due initially to some local change in the blood and cells of the part.

Dr. W. C. Glasgow, of St. Louis, pointed out a similar pathological condition in connection with some forms of acute pulmonary diseases a few years ago.

Payne considers the granular degeneration so often accompanying febrile or inflammatory infections as a *passive* and not an *active* process, resulting from the action on the epithelium or parenchymatous elements of a part, of some injury, which, acting on the vessels and connective tissues, produces hyperæmia exudation and cell-diapedesis. Another supposition is, that these molecular changes are the consequence of the high temperature to which the tissues are subjected during febrile conditions.

Concerning the typical physiological ferments contained in the saliva, gastric juice, pancreatic juice and bile, we ought to say a word. Saliva is composed of proteids, mucous and salts. Its principal function is in reducing starchy matters of food to sugar. It produces besides dextrose and maltose, acrhrodextrine. This takes place in an alkaline solution; but a feeble acid added will be sufficient to stop the action. The active ferment of this fluid is *ptyalin*. The activity of gastric juice is due to the ferment, *pepsin*. The exact nature of the process by which proteid is changed to peptone is not known. This proteolytic action is possessed by some vegetable organisms which are said to form a para-peptone.

Bile.—In the composition of human bile we have bile salts, soap and fats, cholesterin, lecithin

and glycocholates, and taurocholates, also waste products, such as *hæmoglobin* and cholesterin. The digestive action of bile consists mainly of resolving mucous into a proteid and an animal gum; it also assists pancreatic fluids in the emulsifying process, and thus allows of more ready osmosis.

Pancreatic Juice.—The organic constituents are alkali albumin, peptone, leucin, tyrosin, fats and soaps, and indol. It is amylolytic, proteolytic, and steaptic. These powers are attributed to three ferments, amylopsin, trypsin, and steapsin. Proteid digestion is carried still farther than by the gastric juice, and we have a quantity of the non-crystalline nitrogen compounds formed, leucin, one of the amido groups in the fatty acid series, and tyrosin, one of the aromatic series. Now with all this biological, chemical, molecular, and fermentative action going on in the human body, forming a great number of simple and complex organic substances, not only inocuous but poisonous, being ranked as tissue, as well as functional poisons, may we not find abundant cause for disease? Peptones injected into the blood of a healthy animal, according to Brunton, will cause death. Even the healthy blood of one species of animal injected into that of another, will cause death from non-adaptability, according to Mills.

The experiments and observations of Dr. Stockton, of Buffalo, showing the deleterious effects produced by the entrance of the Portal blood into the systemic circulation is highly instructive as bearing on this point.

Microörganisms and many enzymes injected into the blood are readily destroyed, as pointed out by Mitchell, Prudden, and others. Although there is a parasite (the filaria sanguinis hominis) which is known to inhabit the blood. Many observers believe that certain febrile states are caused by the absorption into the blood of peptones, which have gone through and not been split up by the liver into globulin. It is not improbable that absorption of ptomaines from the intestinal canal (which always contains some) may account for many of the so-called "malarial attacks" which so often serve as mantles of relief to our bewildered diagnostic sense. The proof of which may be assumed from the prompt relief which ensues from a brisk cathartic oftentimes. That dangerous condition known as ammonæmia and acetonæmia is more likely due to the absorption of ammoniæ toxines (the result of perverse chemical action) than to the presence in the blood of a special micrococcus. However, it is argued by those who have found microbes in urine, freshly voided, in that diseased condition called bacteruria, that the microörganisms are the essential cause. It is known to physiologists that after severe exercise the alkalinity of muscle juice is changed to acid, due to the presence of sarco-lactic acid. May we not see here the possibility of a combination with some organic base, so as to constitute a poison, the absorption of which determines disease. The chemical examination of sputum in various diseased states of the respiratory apparatus, shows, according to Kossell, Hoppe-Seyler, Salomon, Vonjaksch, Filehue, Stonikow, and others, the presence of peptone, serum albumin, cholesterin, acetone, acetic, butyric, and caproic acids. Glycogen, and ferments resembling pancreatic ferments, besides a large number of different bacteria.

Bitter and Rietsch have shown that cholera microbes contain and elaborate a peptonizing ferment, and Hueppe has shown by experiment that the so-called cholera bacillus produces a toxine, the peculiar properties of which he has demonstrated on healthy animals.

The researches of Kossell show that among the decomposition products of nuclein are found guainine, which occurs in plants and vegetables. The tissue of some animals contain adenine, hypoxanthine and xanthine. Guainine and creatine are said by Vaughan and Novy to mutually replace one another. Creatine is considered by Hoppe-Seyler as an intermediate product in the formation of urea. The cholesterine, found in the body is capable of many chemical substitution products. An analysis of the thyroid gland by Bubnow gave hypoxanthine, paralactic acid, and a proteid substance which he named thryeoprotein.

Nothnagel found that the bile acids taken up into the circulation interfered with nutrition, producing fatty degeneration of organs or lymph glands. Among other poisons called by Brieger toxines, may be mentioned the so-called cadaveric alkaloids, such as neuridine, cadavarine, saprine, mydaleine, putrescine, muscarine, choline, and pepto-toxines. We obtain also, from the putrefaction of albuminous matters, formic, acetic, butyric, valerianic, palmitic, acrulic, acrotomic, glycolic, lactic, valero-lactic, oxalic, glutaminic, and aspartic acids, and various ammonias, besides numerous amine bases, such as propylamine, trimethlamine, etc., also the fixed alkaloidal bases, some of which are given above. Martin and Wolfenden, by their experiments, show that the poisonous property of jequirity or abrin resides in a globulin and an albumose. They also show that peptic albumose is poisonous to dogs. They give an interesting table of comparison of these with snake poisons. Poisonous alkaloids from articles of food have been separated by Brieger and others, in some instances, and are now recognized as probable causes of disease. The question of fermentation as set up by microörganisms and the production of enzymes and toxines by them, is a leading one, and as yet unsettled. We have seen that these processes go on in nature in all instances of decomposition and putre-

faction. The chemical effects may be typically illustrated by the action of toruli and other yeast fungi, which, by fermentation, produce alcohols, acetic acid, etc., from saccharine substances. Parvinski has published the clinical history of a case of asthma in a young person in which the urine contained a large quantity of acetone during the paroxysms. A similar process of fermentation has been pointed out by Brieger, Hueppe, Vonjaksch, and others in relation to the cholera bacillus, as shown by the poisonous effects on animals, by the introduction of the toxine which they had separated from the bacillus culture, and which they believe to have been produced by the bacillus. Klebs and Loeffler have also discovered that the diphtheria bacteria produces a ptomaine which may be the cause of the general infection, the microörganism being only local in its operation, a theory advocated years ago by Oertel. Loeffler could not find the bacillus in the blood, and believes that it always resides outside the body, while the toxine is the real poison.

Brieger and C. Fraenkel have shown that diphtheria bacteria produces two poisons, one of which acts toxically, while the other secures immunity. Zuegler claims to have *isolated* a poisonous crystalline alkaloid from tubercle, which he believes capable of producing the disease. Herman Scholl, of Prague, confirms the conclusions of Brieger and Fraenkel that both anaerobic and aerobic bacteria produce poisons (toxines) or enzymes. The former more than the latter. Dr. F. Lydston, of Chicago, has shown that the evolution of venereal disease is not due to a coccus, but a ptomaine which inhabits the vagina, proving this by experiment. Many observers, however, claim to have found the coccus of gonorrhœa in the joints. There is much doubt as to the exact part played by the bacillus of typhoid fever, and without giving the controversy between Klebs, Eberth, Koch, Meyer, Friedlander, Gaffky, and others, it is probably as Benmer and Peiper say, not really pathogenic, and that the disease is produced, as Brieger suggests, by a toxine. Dr. Gibbes and myself found that sterilized watery extract of tubercle would kill a newly hatched white-fish in fifty-five seconds, completely permeating the protoplasmic mass, while an alkaline extract would do so in about sixty-five seconds. Mice afterwards injected with the fish show no signs of septicæmia or other disease, but die if injected with the same extract. Thus showing a peculiar affinity between protoplasm and tubercle toxines.

To discuss in a special manner the saphrophytic and pathogenic bacteria concerned in a full biological study would take so much time that I can only, as it were, allude to them.

In Eisenberg's tables of known bacteria for laboratory use one hundred and sixteen species are enumerated, etc.

We have found that when guinea-pigs were injected subcutaneously with the extracts made from the lungs of monkeys dead of (their) ordinary phthisis pulmonalis (which is characterized by marked emphysema) the only effects were fever with catarrhal symptoms, lasting about two weeks. On the other hand, when injected with an extract made from tuberculous lungs from the human being, general tuberculosis followed. The morbid anatomy of the monkey lung is identical, from an ordinary view, with that of human phthisis pulmonalis. This probably illustrates the condition which all pathologists recognize now as *pseudo-tuberculosis*. I am aware that it is generally accepted that bacteria or their spores are the essential cause of most, if not all of the infective diseases. And the results of bacteriological investigation during the last few years would seem to support such a doctrine, for the following reasons, viz.: That they can be isolated by color reaction and thus directly connected with the diseased body where found. Moreover, they require a certain time for development, thus corresponding to the period of incubation of such diseases; many of them being ectogenic and saprogenic, anaerobic, or aerobic, can thus live until the opportunity for invasion offers. Being endowed with *life* and multiplying enormously, they can strenuously resist destruction. Being protoplasmic (composed of albuminous material) and microscopic they can more readily affiliate with animal fluids, cells and tissues. Existing in a passive or quiescent state as well as an active one, they can behave like vegetable seeds and spores, and preserve a long period of latency. For these, as well as other reasons which could be adduced, we are led to believe that bacteria must be the cause in some way or other of the zymotic or infectious diseases.

But the question arises, how do they accomplish this? By mere local growth for a parasitic life, by a secretion of material from themselves, in other words, are they secreting cells? or, by inducing at once chemical changes or fermentation of a destructive character with the formation of new substances—poisons?

If we examine carefully into the basis on which certain forms of organisms stand as the materies morbi of a given disease, we shall find that those who are so strong in their faith in the essential microbic origin of disease have not in some instances looked fairly into the status of affairs. For instance, take the case of the comma bacillus of Koch, Fraenkel, in his text-book of bacteriology, third edition, says: No case of genuine cholera has as yet been reported in which the comma bacillus has been absent. From the context, he probably means in the intestines. This has been undoubtedly disproved! This illustrates again what was said at the outset, that all of these questions should be looked at without

bias as far as possible, without regard to nationality, and from the stand-point of clinical as well as laboratory experience.

In whatever manner their life history is exemplified certain effects have been observed connected with them, as a class. Their career *ad interim* from one animal to another is not well known (excepting perhaps the bacillus of anthrax). Some people supposing that they may be saprogenic at first, and thence transformed to pathogenic. In the case of many of them, their spores have either never been really demonstrated to exist, or their behavior formulated. Most species, if not all, are destroyed by the healthy fluids or tissues, and hence their destiny depends upon a favorable *nidus* or *pabulum*, which means disease. It is obvious that their artificial culture in media outside the body or in the lower animals can only approximately reflect their real natural growth and development, for in no instance is it possible to transfer the artificially cultivated microörganism to an animal with the absolute certainty that *nothing else* accompanies the bacterium. Take, for instance, tubercle bacilli, the study of which has given the most satisfactory results. We are being inoculated day by day with tubercle bacilli from the air. Why do any escape? Because some are so healthy that they are immune. But how is it that every guinea-pig inoculated gets tuberculosis? The radical believers in microbiosis say, because they are all susceptible. But the probable explanation is (like that of diphtheria), that the materies morbi is introduced and carried away by the lymphatics and sets up a general chemical change. There is also local change, abscess, at the situation of the inoculation from which are furnished spores which may flourish in the blood or lymph fluid afterward, where they will now find suitable pabulum for development, thus showing the fact that certain bacteria, at least, develope or act under certain conditions only, and upon a particular nidus. Their chemical composition is unknown during a state of activity. That certain species only appear to be pathogenic, would imply a state of specialization analogous to living nucleated cells. That their action is local, primarily, in all cases, may be assumed, because their behavior in no way shows that they themselves invade or maintain their existence in the blood or lymph fluids, because the blood would destroy them. For there are but few instances recorded of any one having found bacteria in the blood, unless we except the anthrax bacilli. Therefore it is probable that pathogenic bacteria develope only where some *previous disease* or *abnormal state* of the body suitable to them exists. That having found such, they take root, as it were, and there by catalytic action primarily, and secondarily, give rise to a particular *toxine* or poison which in turn acts selectively as a tissue poison!

The various facts stated of a toxine connected with diphtheria, typhoid fever, cholera, suppuration and abscess (which has been shown to be independent of bacteria), croupous pneumonia, scarlatina, phthisis pulmonalis, syphilis, tetanus, gonorrhœa, cobra and other snake poisons, etc., together with the well known (chemical) noxious products forming constantly in the body, are sufficient, it seems to me, to show that the etiological agency of bacteria are *mediate* and not *immediate!*

This catalytic action coincides with clinical observations in many directions, as, for instance, the action of snake poisons, as shown by Weir, Mitchell, and the British India Sanitary Reports. From the cobra (one of the most deadly of serpents) an alkaloid as the active principle has been separated, but how far its virulence has been tested we do not know.

There are formed in certain plants, as we know, very poisonous alkaloids and glucosides, many of them corresponding in chemical character and physical behavior to animal alkaloids and colloids; solanine, for instance, is a basic glucoside which under the influence of dilute acids splits up into solanidine and sugar. Both of these active principles are blood poisons belonging to the group of sapro-toxines.

I would say that the experiments of Dr. Gibbes and myself, point to the same thing as to the nature and behavior of tubercle when cultures or extracts are introduced subcutaneously. We have also observed that the insufflation of sun-dried sputum (tubercular) will produce phthisis pulmonalis, while the inoculation of sputum (phthisis) which has been long dry from age will not produce tuberculosis. This seems to have been confirmed by some recent experiments made by Dr. Stone in the Harvard Laboratory, who inoculated guinea pigs, with negative results, with sputum which had been long dried, and which was probably from a case of phthisis pulmonalis. We are now carrying on an investigation to ascertain the effects of inoculating guinea pigs with sputum from phthisical patients, which sputum has been dried in the sun in Southern California, under the supervision of Dr. Norman Bridge, of Chicago. The investigation has not proceeded far enough to show just what effects it will have in the production of tuberculosis, but one remarkable result has already been obtained. Six guinea pigs were inoculated, and within thirty-six hours after the operation two died of septicæmia, showing that this effect, which is a frequent result of inoculation with sputum taken directly from patients, is probably not caused by any organsim, and thus coinciding perfectly with observations which Payne gives in his text-book relating to the occurrence of septicæmia without microörganisms having been discovered in connection therewith.

Concerning the tubercle bacilli, the bacilli

immediately produced in the several diseases known as tubercular, why would any previously prepared nidus be necessary? If they, or their spores (which have not as yet been satisfactorily demonstrated) are constantly invading us (which is undoubtedly true), they must at once be destroyed, or, if gaining access to the fluids of the body, would set up mechanically or otherwise, inflammation and peculiar effects as any other foreign body would. But as such microörganisms must find just the proper conditions for development or not develop, we may assume that such conditions imply previous disease, such as caseation, whether tuberculous or not. We have already seen what complex and delicate processes attend the changes of proteids, and how easy, by radical or atomic substitution, one may be changed into the other; we can therefore see how probable it is that these microörganisms operate by a peculiar property which enables them to decompose or exercise a catalytic action on certain states and kinds of proteids. The subject of immunity and susceptibility of course cannot be discussed here—suffice it to say that the ideas and experiments of Trudeau of New York, and McLaughlin of Texas, in this direction, are worthy of careful attention, and apply not only to microbes but to chemical substances connected with them. To say nothing of the chemical action and products normally evolved, as already explained, Abelous has obtained sixteen species of microbes from the empty stomach by lavage; seven of these were well known varieties, ten of these attacked and changed albumin, twelve fibrin, and nine gluten, ten caused transformations of lactose into lactic acid; thirteen formed a variable quantity of glucose from starch; rapid and energetic decomposition with evolution of gas, leucin, tyrosin, indol, skatol and ammonia compounds took place in presence of saliva. I do not know that all of these observations have been confirmed. But we have confirmed his experiments regarding albumin, which is readily transformed by saliva in the presence of microörganisms outside the body. Experiments with invertin, a ferment found in the intestinal canal, have shown some interesting results in relation to microbe metamorphosis, which are still, however, *sub judici*. Jaccoud finds the pneumococcus, besides several other forms of bacteria, in diphtheria. He believes that individual reaction is what determines the disease.

What application can be made therapeutically of the facts obtained? It is manifest that the diseases in question are caused in some way by the presence or entrance of microörganisms. Therefore the main therapeutic indication is to attack them, or neutralize their operation. We have seen that bacteria either produce for themselves or from the organic substances which they attack, a poison, or enzyme, and that this can be cultivated outside the body in some instances. Pathological chemistry has not demonstrated with exactness the nature of all of these poisons, or classified them, but it is fair to believe that such will surely take place in the near future. Although it is generally supposed that the inorganic chemicals are not tissue poisons, but act only upon the functions through the nervous system, yet we believe that such is not the case when we observe the tissue changes produced by iodine, bromine, phosphorus, arsenic, the silver, gold, platinum and cupric salts, besides some of the vegetable alkaloids. Dr. Gibbes and myself have been able to neutralize the toxic effect of tubercle by admixture with chlorine iodine. Chloride of gold combined with glycerine, salts of platinum and glycerine and peroxide of manganese, outside the body, and with the chlorine, iodine, and gold and sodium chloride in inoculated animals. That certain chemicals have a selective action on tissues cannot be doubted; take, for example, the hypodermic injection of cantharidin used a few years ago by Cornil and Ranvier, resulting in the production of inflammation of the air passages; also the work lately of Liebreich in injecting cantharadate of potassium for the cure of phthisis pulmonalis and tuberculosis, which he believes produces exudation, as when applied to the skin. Also the selective action of strychnia and atropia, the latter acting on the secretory cells of the salivary glands, stopping secretion notwithstanding the induction of hyperæmia. Arecoline, a volatile liquid alkaloid from the areca nut, has a selective action on the heart and is excreted unchanged. Harnack probably states the truth in saying that the action of drugs is molecular and fermentative. On account of the changes which remedies are apt to undergo in the stomach and intestines, by being oxidized or otherwise changed before absorption into the system, the rational way, it seems to me, is to introduce the agent hypodermically; in this way it is possible to get effects which cannot be accomplished otherwise. Dr. Lauderer has obtained beneficial effects in phthisis from hypodermic injection of balsam Peru, which he says goes at once to the diseased part, thus simulating animal fluids or cultures, as exemplified by the effects of Koch's lymph and similar cultures used before by Pasteur, Grancher, Martin, Rengi, Gibbes and others. Dr. Behring has lately found that a number of chemical substances used hypodermically, such as aurochloride of sodium, naphthaline, and trichloride of iodine, were capable of neutralizing the poison of diphtheria in guinea pigs, but the most active of all was the trichloride of iodine. He also practiced, in diphtheria the plan of vaccinating the animals with bacilli cultures. Prof. Merzolski reports much better effects from bromide of gold used hypodermically (in ¼ and ½ gr. doses), than by the usual way of administra-

tion of bromides. The prompt effects of Sammter's treatment of erysipelas by carbolic acid injections, are well known. The superior effects of the treatment of syphilis, by hypodermic injection of cyanide and bichloride of mercury and chloride of gold and sodium are striking, as we all know. Dr. Zumbali, of Rome, found hypodermic injections of chlorodyne in profuse diarrhœa particularly superior to its administration by the mouth. The hypodermic injection of ergot for the relief of hæmoptysis is another example. This agent, administered in considerable quantity by the mouth, will often fail, whereas one, or at most two, hypodermic injections of $\frac{1}{10}$ or $\frac{1}{5}$ gr. of ergotin will generally stop a severe attack. Digitalis also acts upon the cells and vascular system more certainly when so administered. I may also mention the beneficial effects of strychnia used hypodermically, in typhoid conditions. That animal poisons can be neutralized in the body, I believe, will soon be more generally demonstrated. The experience of Tyndall, of New York, in the vaccination process for the cure of tuberculosis, promises well. Hemmeter has stopped the course of diphtheria by the vaccination of the patient with an erysipelas toxine; and Prof. Grancher states that persons suffering from tenia tonsurans are immune from diphtheria. This would seem toshow that there must be a sort of antagonism or isomerism between animal and chemical poisons; and why may not more universal application be made of this principle, with a view of obtaining more specific therapeutic agents and effects? The ethereal oils, on account of their diffusable antiseptic properties, are undoubtedly applicable to the neutralization of disease when used hypodermically, and may prove yet of great value in the zymotic diseases. We are now engaged in using some of them in this way, and find that they actually provoke the liquefaction of effused products. We are also experimenting with members of the benzoin and formic acid series, and the toluidines, in an endeavor to learn their action on metabolism and disease poisons. Dr. Emil Schutz believes that drugs act topically on the secretions by precipitating albumin. He also demonstrated, by cases, that tannic acid may produce urticaria by external application alone. Galezowski, of Paris, has lately discovered a new bacteriacide, by the decomposition of an aniline dye, which has the same properties as pyoktania on the tissues. In this direction we may look for brilliants results, on account of the action of these substances on albuminates. My chief object is to awaken a more general interest in physiological and pathological chemistry, to the end that we may as speedily as possible acquire a scientific chemical therapy, and thus release her from the dungeon of empiricism, where she has been imprisoned with so little light these many years.

THE ADDRESS ON STATE MEDICINE.

Read by Title[1] *at the Forty-second Annual Meeting of the American Medical Association, held at Washington, D.C., May, 1891.*

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Mr. President and Fellows of the American Medical Association:—While I appreciate the honor of the Address on State Medicine, I comprehend the difficulty of doing honor to a position so ably filled by Dr. Henry I. Bowditch, Dr. J. L. Cabell, Dr. George H. Rohè, and other distinguished physicians and sanitarians. I am as another Ruth in the already well gleaned fields of Boaz.

If the importance of the subject assigned to me required emphasis, it could receive no stronger than was given to it at the last meeting of the Association, when its honored president, Dr. E. M. Moore, devoted much of his address to it, while the distinguished Father of the Association, Dr. N. S. Davis, in the Address on General Medicine, dwelt upon the same theme.

State Medicine, narrowly defined, is the control of disease through legislative enactments. In its broader signification it includes all that tends to the prevention of disease and to the fullness of life.

The various departments of medicine exist because health is more to be desired than disease. That department then which preserves health and prevents the development of disease is the peer of any whose function is to remove disease and restore health. Hitherto cure has been the chief thought of the scientific physician. Henceforth prevention will be his noblest theme.

While no new discoveries have been made in this important field during the past year, there has been a notable advance along the whole line, and the importance of aseptic and antiseptic conditions has been more and more pronounced.

There has been throughout the year a very commendable diffusion of knowledge by sanitary conventions and journals, and through State Boards of Health, and perhaps some good has been effected through the laws that make hygiene, and especially the relation of alcoholics to disease, a part of our public school education, though it has often proved so small a part that it might have been eliminated without any appreciable change. Those who instruct must understand what they assume to teach before satisfactory results can obtain, and the public must comprehend the importance of physiology and hygiene before teachers will acquire the necessary knowledge. In America health, both public and private, has generally been left to take care of itself, and the scientists who devote their lives to its protection and development have too often been deemed impracticable cranks. Cure men of injuries and

[1] On account of the unavoidable absence of its author.

diseases and they will at least load you with gratitude; save them from injury and disease, and your service is beneath consideration, and while governments have been disposed to pay and honor those rendering valuable service in other departments of life, too often neither pay nor honor has been awarded the sanitarium. Thus the first English army sent to the Crimea was decimated through want of sanitary care. With the second was sent a special sanitary commission, and after the campaign it returned in better sanitary condition than existed among the troops at home. The government crowned with honors the officers through whose neglect the first army was lost, but did not even commend those through whose wisdom the second was saved. Whilst this course has been the rule, during the year, Germany has made a commendable advance by conferring upon Koch a Baronetcy for distinguished service in the field of preventive medicine. In America, most of the States expect scientists to devote their lives to sanitation, on health boards and elsewhere, without fee or hope of reward, and to save the community from disease without adequate legal authority. Perhaps when sanitarians charge for their services they will be considered valuable, as mankind are disposed to estimate the value of every article at what it brings in the market. While practical sanitation is always a philanthropy it is never a charity. Scarce any other service yields so valuable a return. "An ounce of prevention is worth a pound of cure."

While in sanitary science many fields remain unexplored, and some differences exist, it is far in advance of its legally authorized application, and far enough advanced to see that the truth is within reach, and that few diseases are not amenable to its methods. If legal enactments for the preservation of health and life, were abreast with sanitary knowledge, the United States would annually save vast sums of money, thousands of years of productive labor and thousands of human lives. The recent advance in the department of medical education is full of encouragement. Since the organization of this Association, forty-four years ago, the burden of its prayer has been a *higher standard of medical education*. After twenty years of such effort, a committee, composed of its most eminent members, Drs. Gross, Bell, Condè, Pope and Bigelow, reported, "Its efforts have hitherto failed to produce any very great practical results;" and at the same meeting, another committee of equally distinguished physicians, Drs. Alfred, Stille and N. S. Davis, reported resolutions in favor of a better education as a pre-requisite to matriculation, and attendance upon three annual graded courses of medical instruction before admission to examination for a degree. During the past two decades the praying and resolving has gone steadily forward, ably seconded by the American Academy of Medicine, yet, judging from a paper read before that body last year by Dr. Dunglison, these more than forty years of prayer have fallen short of the Throne.

The statistics of the past year are, however, very encouraging. According to the excellent report of that eminent sanitarian, Dr. John H. Rauch, in 1882, only forty-five colleges in the United States required any educational qualification for matriculation, now 129 require at least a good English education. In 1882, only twenty-two, and some of these relapsed, required three full courses of lectures of six months each; now there are eighty-five, one-fourth of them having been added, with others that have taken action since the publication of the report, during the past year. In 1882, only 52 colleges had a chair in State Medicine. In 1891, there is such a chair in 117 colleges. "Nothing succeeds like success." Nothing demonstrates the power of prayer like the demonstration. When we move forward toward the answer it comes with quickening power. Until then it remains

> "The *hidden* motion of a fire
> Within the human breast."

How much the action of the Illinois State Board of Health, requiring a three years' graded course as a pre-requisite to the acceptance of diplomas, and the results of the examining Boards of Virginia, North and South Carolina, Minnesota, New Jersey and Alabama had to do with hastening the answer, we will not stop to inquire, but I think we will all approve their action.

This advance, wherever honestly made, will tend to unify medical knowledge and destroy medical sects. "He who knows it half speaks much and is always wrong." Those who rest on their materia medicas, and antagonize the regular profession, which seeks to look at therapeutic action from every rational standpoint, though only as one to an hundred, are chiefly known by their clamor for equal representation on public boards, as though there could be a homœopathic hygiene, an eclectic etiology or a Christian science chemistry. Therapeutics is the roof that covers the temple; necessary to the temple, valueless without it. When the sciences from which spring both prevention and cure, are taught in graded courses, and absorb the thought of the physician, he will not thrust himself outside the pale of scientific medicine for such irrational dogmas as Ars., Bel., Bry., etc., cure whatever is set opposite them in the "Symptoneum Codex" of Hahnnemann.

While the marvelous progress of this last quarter of the century has in many departments of life created contempt for the slower methods of education, in medicine, notwithstanding the tendency to the development of specialties, there has been an increased demand for good work,

thorough work, from all who cross its portals, both because there has been a truer conception of the length and breadth and depth of medical science, and a higher appreciation of the value of human life.

And we may well notice and commend the recent evidences among the people of increasing faith and interest in this department of medicine, manifested by such substantial methods as the gift of Henry C. Lea, of Philadelphia, the effort, with Mrs President Harrison at its head, to endow a Medical Department at Johns Hopkins, and the kind words of Mrs Gen. John A. Logan, in the *Home Journal*, in favor of endowing a medical department to the University about to be established at Washington.

As the broader possibilities of State Medicine become more and more demonstrable its relations to political economy and true statesmanship are more apparent.

It is unnecessary to recount before this Association the loss the nation sustains through preventable diseases, or the methods by which they may be prevented. While there may be errors in diagnosis, and while sanitary methods may not be infallible, it is the duty of the government to apply sanitary knowledge as fast as developed, and to develop sanitary science. If in its life destroying service it rightly says "Better that ten guilty men escape than that one innocent man perish," in its life saving service it may well say, better an hundred innocent detentions than that one infection laden person scatter yellow fever, cholera or small-pox, disease and death, throughout the land, especially now that quarantine has ceased to mean forty days and forty nights of fasting and prayer, but only disinfection and detention until the period of incubation has passed. If the citizen is entitled to protection against injury and death, accidental or designed, he is equally entitled to protection against the more numerous and dangerous foes, that he can neither foresee nor avoid, whose poisons enter his body with necessary air, water and food.

Every intelligent sanitarian and statesman understands the power of State Medicine to save from disease and death those for whom the State exists. Scarce two centuries have passed since small-pox ravaged the earth in winter, and various plagues decimated it in summer. In London, then perhaps the most highly civilized city in the world, with a population of only half a million, during the winter months from one thousand to fifteen hundred per week perished from small-pox, taking its victims from among all classes. It robbed William the Conqueror of his beloved Queen and filled potters fields from the homes of the poor, and as the statesman and historian, Macaulay, has graphically said:

> That disease over which science has since achieved a succession of glorious and beneficent victories was then the most terrible of all the ministers of death. The havoc of the plague had been far more rapid, but the plague had visited our shores only twice within living memory; and the small-pox was always present, filling the churchyards with corpses, tormenting with constant fears all whom it had not stricken, leaving on those whose lives it spared the hideous traces of its power—turning the babe into a changeling at which the mother shuddered, and making the eyes and cheeks of the betrothed maiden objects of horror to the lover.

During the summer of different years from eight to ten thousand a week died of the plague, and when the city was not visited by special pests and plagues, the death-rate exceeded that of the modern London by more than forty per thousand, nearly twice the proportion that died last winter in Chicago. But this is not wholly a history of past ages. Wherever the same unsanitary conditions are permitted to obtain we still hear the tramp of the White Horse. Only two decades ago the yellow fever destroyed in our own Memphis an equally large proportion of lives.

The committee appointed by the Forty-seventh Congress to investigate and report the best means of preventing the introduction and spread of epidemic disease, reported:

> In the yellow fever epidemic of 1878, which raged so fearfully and fatally at New Orleans, Memphis, Holly Springs and Grenada, and extended far up the Ohio River, and to many other places, the actual loss to the people of the United States in the element of material wealth, to say nothing of impaired health and loss of life, is variously estimated by those best informed on the subject, at from $100,000,000 to $200,000,000.

President Hayes, in his message to Congress, December, 1878, said:

> It is impossible to estimate, with any approach to accuracy, the loss to the country occasioned by this epidemic. It is reckoned by hundreds of millions of dollars. About one hundred thousand cases are believed to have occurred, of which about twenty thousand, according to intelligent estimates, proved fatal.

In a report made by the very efficient Secretary of the Michigan State Board of Health, Dr. Henry B. Baker, he says:

> The annual saving of life has amounted to eleven hundred lives, representing seven thousand cases of sickness. Estimating each of these lives at only $500 each, about half the value of an adult slave, and you have an annual saving of $550,000. This the known saving from three diseases only.

Averaging the time that each of these seven thousand cases would have been unable to work at a fortnight, and there was an annual saving of 270 years of productive labor. Thus we begin to see the possibilities of State Medicine. If such results can obtain with crude and imperfect sanitary laws, hindered by State limitations, and in a State so illy appreciating these benefits that its Governor could formally recommend that the Board through whose efforts the results were obtained be abolished, what may we not hope as sanitary science and law develop, when the people appreciate their importance, and when the

National Government efficiently coöperates with the several States?

But what a comment on the intelligence of the people, when the Governor of a great State falls so far short of true statesmanship that he can recommend the abolishment of a Board that, through its most efficient Secretary, has produced such results.

Take one other illustration of what can be done, of what should be done, through State Medicine: Under the improved sanitary conditions of London in 1888, its deaths were 18.5 per 1,000. In the City of New York they were 25.9. Both in climate and location nature has done more for New York than for London, and its death-rate should be less. If, with the city of Brooklyn, in every way similarly situated, it was reduced to that of London, there would be an annual saving of 15,988 lives, and if two persons should be continuously sick for each one dying, there would, by reducing the sick-rate to that of London, be an annual saving of nearly 32,000 years, and if the expectation of these lives was counted, what innumerable years would be saved, to say nothing of the expense of this excessive sickness and death, or of its suffering and sorrow. If this in New York alone, what of the National loss that State Medicine, properly applied, would save? Is the statesman wise, is the legislator a statesman or a philanthropist who permits this preventable loss of life and labor?

One of America's greatest men has described this as a Government "of the people, by the people, for the people," a nation where all power emanates from the people, and where all power not delegated to the General Government remains with the States, the intent being to delegate all power that the individual States cannot efficiently exercise. We are a nation of nations, with the grandest conception of rights, and the broadest provision for their protection known to man, assuming that "all men are created equal," not physically, intellectually or morally, but equal before the law, possessing an equal right to exercise and enjoy every natural right, an equal right to "life, liberty and the pursuit of happiness." Life and all its possibilities first, for in its preservation lie all other rights, and in its development, physically, intellectually and morally, all the best interests of the individual and the State, and liberty, without which life has little value—not liberty to do wrong, for no one possesses a natural, or can acquire a political right to advance his own at another's expense; not liberty "to secure the greatest good to the greatest number," but liberty to attain the greatest possible good without injury to another.

This principle not only lies at the foundation of State Medicine, but of all good government.

At the organization of this Government various departments were created, all looking toward the development and protection of its varied interests. While we concede the importance of all these and of those created through the development of other interests, we naturally inquire for whom do they, for whom does the State exist? Is the thing created superior to those for whom it was created? Is not the health, the development, the life of the people its highest interest? Surely the treasures about their hearthstones, the lives of friends and neighbors, are more dear to the people than either commercial or financial interests, or "the cattle upon a thousand hills."

While all civilized nations have recognized the value of life, inflicting their severest punishment upon those who wantonly and maliciously destroy it, no adequate provision has ever been made for its protection against the causes by which it is constantly being destroyed. Is there not inconsistence in laws that destroy the life of him who wantonly destroys the life of another, while for each life thus destroyed they permit the destruction of an hundred or a thousand by preventable disease. If life is the highest interest of the nation, the dearest right of the citizen, the nation that fails to make every possible provision for its protection is inexcusable. Is a life taken by the stiletto or the bullet a greater loss to the nation, to the individual or to his friends, than when destroyed by pestilence or plague?

The National Government has recognized from its organization its authority and power to control disease, but lack of sanitary knowledge on the part of the legislator, whose education has not included sanitary science, has made medical legislation inefficient, while those selected to administer the law have too often been appointed for party purposes.

In February, 1776, Congress authorized the President to assist the States in preventing the admission of disease from foreign countries. Three years later the authority was extended and placed under the control of the Treasury Department, not, it would seem, from any just appreciation of the importance of saving life, or from any natural relation between health and finance, but because quarantines interfere with commerce, and commerce was a source of revenue, and so revenue has ever been deemed better than health by the legislator.

In 1798, the Marine-Hospital Service was organized, its purpose being to make provision for a class of citizens who served the nation on the high seas, but who were homeless when at home. For the same reason this too was placed under the care of the Treasury.

With a few unimportant provisions the status of State Medicine remained unchanged for more than half a century. After Asiatic cholera had thrice visited our shores, carrying death wherever it went, and after civil war had more fully demonstrated the relations of medicine to public health,

Congress authorized the Secretary of the Treasury to adopt such measures as would guard the nation against another invasion of cholera, and placed at its disposal an ample fund for the purpose, but, as if doubting the power or the wisdom of preventive measures, it only provided for its expenditure during the seven months intervening between May 26, 1866, and January 1, 1867. Though the hastily and imperfectly organized measures did not keep the disease from the country, they robbed the destroyer of his accustomed victories, and illustrated the possibilities of State Medicine.

Ten years later Congress authorized the application of preventive medicine to the District of Columbia, and this beautiful city was lifted out of the mud and transformed from one of the most unsanitary to one of the most healthy cities in the world.

Stimulated by the ravages of yellow fever, in 1878 Congress provided for a Health Commissioner for the District, and a health officer at a salary of $3,000, and the same year an Act was passed requiring the Surgeon-General of the Marine-Hospital Service to make rules for certificates by foreign consuls, showing the condition of vessels and cargoes bound for the United States.

Hitherto all action looking to the application of State Medicine had been indirect, both National and State Legislatures fearing, apparently, to acknowledge its power.

In 1879 Acts were passed creating a National State Board of Health, defining its powers, and authorizing it to prevent the introduction of contagious and infectious diseases, its most important feature being the acknowledgment of State Medicine as *a life-saving service*. Hitherto it had been a "penny wise" affair, placed under the Treasury and created to save money. The National Board of Health was a political acknowledgment of the value of human life, and was required to report directly to the President of the United States. Though, like many of the State Boards, which were the prophets of its birth, it was created under a pressure that convicted without convincing the legislator, many of its provisions were crude and imperfect. With the battle on, it was thrown into action with the information and order of General ———: "There is good fighting all along the line. Go in anywhere," but it achieved a success that will make it memorable in the history of State Medicine. Working in harmony with local boards of health, it strengthened their arms, and carried hope to their people, and changed the plague-stricken Memphis from a lazaretto to one of the healthiest cities of the South. In addition to illustrating the control of sanitary science over the great American plague, it published many valuable scientific papers and demonstrated the possibilities of preventive medicine.

While great credit is due to all connected with it, its powers were too limited and ill-defined and it lacked the single and forceful head, as essential in our conflict with the hidden foe that is ambushed in the dark lanes and alleys of our cities, and in every swamp and bayou, as against an army with banners. While legislation in the interest of health has often been liberal when some great plague has struck terror to all hearts, efforts at such times are like attempts to stay the floods of the Father of Waters when the levees have broken; or to fortify a city with the enemy in its streets. To insure success provision must antedate invasion. There must be permanent authority with power to act, to insure protection against zymotic disease.

The Marine-Hospital Service, with an executive head clothed with the energy of Surgeon-General Hamilton, has still further illustrated the vital importance to the nation of State Medicine. But this Service was organized for a narrow sphere of duty, and though its boundaries have been greatly enlarged, its authority comes second-hand from a department with which preventive medicine has nothing in common, save that "public health is public wealth." It is only an indirect National acknowledgment of the possibility of staying the ravages of disease.

Boards of Health have been organized in nearly every State in the Union, and wherever they have been composed of scientific sanitarians, and lifted above the narrow lines of party politics, and given authority to act, they have been active factors in the development of State Medicine. But the plagues that destroy recognize no State lines, know no State rights, and when the several States delegated to Congress the right to regulate commerce with foreign nations, and among the States, they planted better than they knew, and gave the National Legislature authority to exclude from the country the great plagues that follow commerce, and to interdict their passage from State to State; but if the Supreme Court has decided correctly, that a State has no right to prevent alcoholic liquors from crossing State lines, and being distributed in original packages, a State has no right to prevent original packages containing the germs of septic disease from being admitted and distributed among the people. To secure the full force of State Medicine there must be a National head with power to coöperate with State and local boards of health.

The constitution has also wisely provided that Congress shall have power to provide for the common defense and general welfare of the United States. Does not the general welfare include defense against the preventable diseases that cause more suffering and death than all other causes—diseases that "walk in darkness and waste at noonday," against whose poisoned arrows the citizen, in his individual capacity, is powerless to secure protection.

The National Government, through its various departments, collects accurate statistics demonstrating the condition of commerce, manufactories, agriculture, mines, all that has hitherto been considered the important factors of political economy, but it has never realized that vital statistics are its only means of measuring the life wave of the nation, of keeping the life account, on which rests all its political economy, and the only foundation of sanitary science. Without knowing where disease exists, its disabilities and deaths, its causes and means of prevention, there is no possibility of knowing when, where, or how to prevent or arrest it.

That eminent scientist and sanitarian, Surgeon Billings, with most commendable zeal and great labor has endeavored to evolve out of the imperfect data furnished, the vital statistics of the nation, but the result has necessarily been imperfect and unsatisfactory.

Mind and morals act through matter. To evolve healthy mental and moral action there must be healthy physical organisms. The children of the nation spend a long portion of the formative period of their lives in its schools. Its health interests demand their scientific sanitary supervision.

The National Government should also decide who may enter its life-saving service. It requires the attainment of a certain standard or qualification to those who enter this service in the Army and Navy and Marine-Hospital. Are those who serve it in these departments any more important members of the body politic than the citizen who develops the industries of the nation, pays its expenses, makes and unmakes its officers? It may be said that they pay for the services they receive, and are capable of judging of the qualifications of those they employ. In this busy world few men acquire the knowledge that will enable them to judge of the qualification of a medical adviser. The general welfare of the United States demands that the government establish a standard of medical education which shall be attained by those who enter its life-saving service, that every citizen may know when his life is broken by disease or injury, that the government only permits those worthy and well qualified to administer to his wants. The fact that the citizen pays for the service does not exonerate the State from providing that he shall receive that for which he pays, and that its protection shall operate wherever its flag may float.

The medical college is responsible for medical education. While great honor is due to the distinguished men who, without State or National aid, have built up their medical schools, advanced the standard of medical education and performed the most important educational service known to the nation, the preparation of those who have charge of the life and health of the people, they have too often been compelled to snatch their lecture hours from an exacting and poorly paid practice, and to lecture without the aid of the original investigation and research essential to true progress; and unfortunately, in many States, any half dozen citizens can secure a charter for a medical school and graduate whomsoever they will. Does not "the general welfare" demand that the National Government shall establish a standard of qualification, and that the State shall provide such aid to this important branch of education as will enable teachers to devote themselves to its interests?

Government is as much bound to protect the citizen against ignorant pretenders in medicine as against preventable disease, and as much bound to extend protection against disease as against death from any other cause. This can only be done through provision for original research in the investigation of disease.

While progress in preventive medicine has been slow, perhaps because of the work of medical philanthropists, who in preventing disease have limited the income of a profession that lives by curing disease, have done the work for nothing, gone afoot and paid their own fare, the progress has been sufficient to demonstrate the importance of a National department that will not only utilize the knowledge already acquired, but prosecute such further investigations as will secure richer blessings.

The enlightened statesman knows that the strength of a nation lies in the strength of its people, and that the highest function of law is the protection of their life, health and development, that "public health is public wealth." When he comprehends that the great epidemics that destroy mankind, causing untold suffering and immeasurable financial loss, are amenable to State Medicine, may we not believe that the National Government will establish *A Department of Public Health*, under whose protecting ægis it will gather the Marine-Hospital Service, the Bureau of Education, of Vital Statistics and of Animal Diseases, the Climatological and Signal Service, all that pertains to the health and development of the people, providing that, as in the Army and Navy, its appointments shall be preceded by thorough examination and made for life. In such a department there would be enrolled a body of scientists unequalled in the world, working in harmony for the highest interests of mankind—the prevention of disease, the preservation of life and the uplifting of humanity, giving dignity to State Medicine and the highest possible physical, intellectual and moral development to the nation. The most hopeful event during the past year is that a bill looking to this end was introduced into Congress. Such a department devoted to original research and lifted above political mutations, guided by the

energy and intelligence of a Hamilton, a Rauch or an Eaton, will be an honor to the nation and a blessing to the world, and will hasten the day when preventive medicine and surgery will well nigh cover the field of medicine, when health will be the rule and disease the rare exception, when "The days of man shall be three score years and ten and if by reason of strength four-score years," nay, five-score years, five times the length of his development period.

ORIGINAL ARTICLES.

THE GROWING IMPORTANCE OF CHEMICAL STUDIES IN MEDICAL EDUCATION AND IN MEDICAL RESEARCH.

Read in the Section of the Practice of Medicine and Physiology at the the Forty-second Annual Meeting of the American Medical Association, at Washington, D.C., May 5, 1891.

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Gentlemen of the Section:—The object which I have in view in the selection of this subject is to call your attention to the present importance of chemical studies in the elucidation of medical problems. Chemical theories and discoveries have frequently in the past been of service to medicine, but they offer much greater promises for the future. With the past services you are familiar, and I desire to point out some of the most important problems which are now being investigated or which only await careful study.

The Chemistry of the Animal Cell.—With the form and size of the various cells of the animal body, both in health and in disease, we are fairly acquainted, but we must remember that these ultimate entities of life have also a physiological and a chemical history. Their function, as well as their form, is deserving of study. Upon what do they feed? What is the nature of their secretions and excretions? These and many other questions pertaining to their life history are worthy of study.

The diverse ways in which the various cells of the body and the several parts of the same cell are affected by staining reagents suggest important differences in chemical composition. The work of Miescher[1] and Kossel[2] has given us much valuable information concerning the composition of the nucleus of the cell. They have shown that certain compounds exist as characteristic constituents of the nuclei. These belong to the proteids, but differ from other members of this group inasmuch as the albumin molecule is not free, but combined with phosphoric acid. This combination is exceedingly loose and can be broken up by boiling with water. In fact decomposition occurs at ordinary temperature if the compound is kept moist. This substance has been called by Miescher nuclein. It has been generally supposed that the phosphoric acid in the body exists as inorganic salts. This is true of the most of that contained in the bones, muscles and blood, but not of that of the glandular organs. Kossel has shown that from 60 to 75 per cent. of the total phosphoric acid in the spleen exists as nuclein, while from 30 to 50 per cent. of that of the liver, and 50 per cent. of that of the pancreas is found in the same combination. The smaller the proportion of nucleated cells in any tissue, the smaller is the amount of nuclein. In the muscle of the adult animal the amount of phosphoric acid in combination with albumin is only 7 per cent. of the total phosphoric acid.

It will be seen from the above that the amount of organically combined phosphoric acid is a measure of the nuclear substance in a given tissue, and this can be isolated and weighed, thus giving a more exact estimate than that obtained by counting the nuclei under a microscope. This procedure can be made serviceable not only in physiological but in pathological work. Thus, Kossel finds that while the amount of nuclein-phosphoric acid in normal blood is too small to admit of quantitive determination, as much as 51 per cent. of the total phosphoric acid in leucocythæmic blood may exist in this form. Again, in the examination of pus, the chemical method will detect degenerative changes in the corpuscles before they can be recognized by the microscopical examination of unstained specimens.

However, albumin and phosphoric acid are not the only constituents of the nuclei. Nuclein, on being artificially decomposed, furnishes certain basic substances, as adenine, guanine, hypoxanthine and xanthine, which are characterized by the large amount of nitrogen which they contain. Adenine contains no oxygen, is a polymer of hydrocyanic acid, and indicates by its reactions that it belongs to the cyanogen compounds. Schindler[3] has shown that 7 per cent. of the total nitrogen of the thymus gland exists in adenine. The large amount of hypoxanthine and xanthine in leucocythæmic blood arises from the decomposition of the nuclein.

Nuclein seems to be an acid which in the various tissues is combined with a base of somewhat variable composition. This basic substance is called by Kossel, "histon," and it has been designated by Miescher as a "basic pepton."

The above mentioned facts throw much light upon phenomena which have long been observed, but not understood, by histologists. The marked

[1] Med. Chem. Untersuchungen von Hoppe-Seyler, S. 441, 502. Archiv. f. Anat. und Physiology, 1881. Anatom. Abtheil, S. 193.
[2] Zeitschrift f. physiology Chemic, B. 3 S. 284; B. 4, S. 220; B. 5, S. 152 and 267; B 6, S. 422; B. 7, S. 7; B. 8, S. 511; B. 10, S. 248.
[3] Berliner klin. Wochenschrift, 1889, S. 416.

tendency of the nuclei to act as reducing agents is explained by the presence of the oxygen-free molecule of adenine, and the molecules of guanine, hypoxanthine and xanthine, whose ready transformation into more highly oxidized products is well known. The action of acetic acid on nuclei is due in part to the precipitation of the nuclein, and in part to the fact that it dissolves out the basic substance.

These researches have also been of service in the study of the function of the nuclei. Kossel[4] has shown that after prolonged hunger the nuclein is not diminished. This substance does therefore not form a reserve food supply, as is the case with glycogen, fat, and in part with albumin. He has also demonstrated that the nuclein serves in some way yet unknown in the building up of tissue. The muscles of the young animal are rich in glycogen while those of the adult contain only traces. The fact that adenine belongs to the cyanogen group, already mentioned, is suggestive in this connection. Cyanogen bodies have a well known tendency to transform themselves into substances having a complicated constitution. Hydrocyanic acid changes, on standing, into a brown mass, known as azulmic acid, which has a complicated, and as yet unknown, chemical structure; and adenine undergoes, under certain conditions which obtain in the body, a similar transformation. This offers, at least, a suggestion as to the manner in which the animal cell accomplishes its synthetical work. The fact that adenine belongs to the cyanogen group is further suggestive in consideration of the formation of both the bacterial and metabolic poisons from proteids. Adenine itself, in quantities of one gram and slightly less, is fatal to dogs of medium size when administered by the mouth. No study of its effects when injected subcutaneously or intravenously has yet been made, so far as I know.

After a study of the facts, which I have briefly placed before you, one cannot avoid the impression that continued investigations in this line may lead to important discoveries which will be of service to us in unraveling the mysteries of cell activity. With the promise of such a reward the labor and energy of a lifetime may be given to this work. With a knowledge of the conditions under which cells multiply, of the nature of their pabulum, of the manner in which they convert foods into living tissue, what a great advantage the scientific physician of the future will have over us, his ignorant predecessors, who are yet compelled to rely so largely in the treatment of disease upon empiricism.

The intelligent chemist of to-day does not dream that by the aid of his science he will ever be able to construct a living cell, but he does hope to ascertain the conditions under which cells thrive and multiply, and those under which they die. He may acquaint himself with the nature of their substance, and from this knowledge he may be able to supply them with proper food. He may point out to the practitioner the effects of certain therapeutic agents upon the cells of the liver and, what will be of equal importance, the action of the cells of the liver upon the therapeutic agents. We are at present wholly ignorant of the changes wrought by the chemistry of the body in the majority of the drugs which we employ. We know but little of the form in which our medicinal agents reach the diseased organ, and yet without any knowledge on this essential point we endeavor to effect the nutrition of the various parts of the body. A substance may undergo one or more marked changes in chemical composition during its passage through the body. Thus camphor (C_{10} H_{16} O) is first converted into camphorol (C_{10} H_{15} (OH) O) by taking up hydroxyl, and finally is eliminated from the body in combination with glycuronic acid. Not only does the camphor undergo these changes, but evidently it alters tissue metabolism. Glycuronic acid (C_6 H_{10} O_7) is a product of beginning oxidation of sugar, and in normal tissue metabolism rapidly goes through other steps in the process of oxidation and breaks up into carbonic dioxide and water, but when brought in contact with a substance not readily oxidized, such as camphor, it is eliminated from the body unchanged. Changes in physiological action often follow from these alterations in chemical structure. A poison may be rendered inert, or an inert body may be converted into a poison. As an example of the former, the fact that a certain amount of the highly poisonous substance, phenol, is changed into phenol-sulphuric acid, which is inert, may be mentioned; while a change in the opposite direction occurs in those persons to whom a bit of egg or some article of common food is poisonous.

With some of the synthetical changes brought about by the living cell, the labors of physiological chemists have already made us familiar. The work of Bunge and Schmiedeberg[5] on the formation of hippuric acid might be taken as a model for similar investigations. That benzoic acid administered by the stomach appears in the urine in the form of hippuric acid was first observed by Wöhler in 1824. Historically this fact is of interest because it was the first demonstration of synthetical processes in the animal body, and was at variance with the then, and for many years thereafter, dominant theory of Liebig, who taught that all the chemical changes in the animal body are analytical. Bunge and Schmiedeberg instituted a series of experiments with the view of determining what cells of the body are concerned in the synthesis of hippuric acid. First, benzoic acid and glycocoll were injected into the dorsal

[4] Berliner klin. Wochenschrift, 1889, S. 415.

[5] Archiv. f. Experiment. Path. und Pharm., B. 6, S. 233.

lymph-sacs of frogs from which the liver had been removed. The appearance of hippuric acid in the urine demonstrated that the liver was not, at least, the only organ in the body which synthesizes hippuric acid. It was next shown that hippuric acid is not formed in nephrotomized dogs. From this, however, it could not be positively asserted that the synthesis occurs in the kidneys, for it might be said that the removal of the kidneys had so disturbed the other organs of the body that they did not perform their functions normally. But this criticism was seen and provided for by another experiment. It was found that the passage of defibrinated blood, to which benzoic acid and glycocoll had been added through a kidney after its removal from the body, was accompanied by the synthesis of hippuric acid. It was thus shown that the extirpated kidney is capable of carrying on this synthesis. This is found to be true even after the excised kidney has been kept in a refrigerator for forty-eight hours. Then the question arose, is this synthesis accomplished by the living cell of the kidney or by some lifeless chemical constituent of the organ? Further experiments showed that the synthesis does occur if blood containing benzoic acid and glycocoll be allowed to stand in contact with a kidney which has been cut into pieces, but does not occur if the pieces be rubbed up in a mortar with glass into a homogenous mass. From this it is concluded that the activity of the living cell is essential to the performance of this function. Furthermore, it has been demonstrated that the synthesis will not occur if blood, which has been freed from its corpuscles, is employed, and the same is true if blood in which oxygen has been displaced by carbonic oxide is used.

Equally valuable with the above are the investigations of Schröder,[6] by which he has shown that urea is in part at least formed in the liver from ammonium carbonate, and the labors of Minkowski[7] on the formation of uric acid. Both of these experimenters have, as you know, demonstrated facts which are of importance physiologically, and which have also cleared up some hitherto unexplained observations in pathological states.

It may not be out of place to point out the desirability of another investigation similar to those mentioned above. Physiological chemists are much impressed with the theory that kreatin is one of the antecedents of urea. However, if kreatin be administered by the mouth or injected into the blood it reappears in the urine, either unchanged or in the form of kreatinin. This is supposed by some to be sufficient proof that it is not an antecedent of urea, but, as Bunge[8] states, this is not necessarily the case, because the kreatin formed in the muscles may in its nascent state be converted into urea, while the same substance injected into the blood may escape this transformation. This question is one of great practical importance, and its solution promises to throw some light upon so-called uræmia, the chemical causation of which has recently received some confirmation, although the old idea that the retained urea is the active poison, and the theory of Frereichs that ammonium carbonate is the harmful substance, have both been abandoned. Landois[9] laid bare the surface of the brain and sprinkled the motor area with kreatin, kreatinin and other constituents of the urine. Urea, ammonium carbonate, sodium chloride and potassium chloride had but slight effect; but kreatin and kreatinin caused clonic convulsions on the opposite side of the body, which later became bilateral. These convulsions continued at intervals for from two to three days, when, growing gradually weaker, they disappeared. From this, Landois concludes that chorea gravidarum is a forerunner of eclampsia. Now, kreatin is chemically, as has been shown by Volhard[10] and Strecker,[11] a substituted guanidin, and it only needs to be converted into methyl-guanidin in order to produce all the convulsive symptoms observed in so-called uræmia. Moreover, Brieger[12] has shown that certain bacterial cells are capable of transforming the inert kreatin into the powerful convulsive poison, methyl-guanidin. The probabilities are that the cells which under normal conditions convert kreatin into urea are so affected by the accumulation of their own product, urea, which the kidneys fail to properly eliminate, that one substituted guanidin, kreatin appears as another member of the same class, methyl-guanidin, the former being a physiological product and not harmful, while the latter results from a modified and abnormal action, and is highly poisonous. I will admit that this theory has much reason in it, and I am now pointing out some of the medical problems which demand chemical studies for their elucidation, and I would suggest that an examination of the muscles of the brain of one who has died from so-called uræmic convulsions for methyl-guanidin, and a determination of the amount of kreatin in the same organ, would be a work worthy of the time given to it, whatever the result may be.

The statements made above find important support in the recent highly valuable work of Drechsel,[13] in which he has prepared lysatin and lysatinin directly from casein, and from these, urea. Lysatin and lysatinin are homologous with kreatin and kreatinin, and on being boiled with baryta will yield urea. Although we have long

[6] Archiv. f. Exper. Pathol. und Pharm., B. 15, S. 364, and B. 19 S. 373.
[7] Ibid., A. 21, S. 41.
[8] Physiologische Chemie., 2d Auflage, S. 291.
[9] Uræmia, 1890.
[10] Zeitschrift f. Chemie., 1869, S. 318.
[11] Jahresbericht über die Forschritte der Chemie., 1886, S. 686.
[12] Berliner Klin. Wochenschrift, B. 24, S. 817.
[13] Berichte der K. Särhs. Gesellschaft, August 4, 1890.

known that the urea eliminated in the urine must have its origin in the proteids of the food, Dreschel is the first chemist who has been successful in breaking up a proteid by artificial means in such a way as to produce urea. The same is true of the formation of a kreatin from a proteid. This, which may be ranked as the most important of recent contributions to physiological chemistry, adds greatly to our knowledge of the kreatin bodies, and suggests a possible solution of the relation existing between these and urea in the normal metabolism of tissue. The physiological action of lysatin has not been as yet studied, nor is it known whether or not it would reappear in the urine as urea if given by the mouth or intravenously. We may sum up the positive knowledge which we have on this point as follows: 1. A number of substances belonging to the kreatin group are formed from proteids (some in the body, as kreatin, kreatinin, cruso-kreatinin, xantho-creatinin and amphi-creatin, and some by artificial means, as lysatin and lysatinin); 2. Kreatin is a substituted guanidin; 3. Methyl-guanidin is a highly poisonous substance, and this is true of both that obtained from putrefying flesh and that prepared from kreatin. It produces marked dyspnœa, muscular tremor and general clonic convulsions.

That there is a marked disturbance of tissue metabolism caused by the inhalation of vitiated air has been shown by Araki.[14] In the urine of animals rendered unconscious by being kept in a confined space this experimenter found albumin, sugar and lactic acid. If the animals had been kept without food for some days before being subjected to this experiment, albumin and lactic acid, were found, but no sugar appeared. This was undoubtedly due to the fact that the glycogen of the body had been exhausted by the fasting. Identical results were observed in animals, which were poisoned with carbon mon-oxide. Dogs which were poisoned with curare, and in which the respiratory movements were maintained artificially secreted very little urine, but the blood was found to contain considerable quantities of sugar and lactic acid. The urine of frogs in which the respiration was retarded by the production of tetanus with strychnia secreted urine containing sugar and lactic acid. In the urine of three epileptics there were found albumin and lactic acid directly after the seizure. The factor common to all these cases is diminished oxygenation of the blood, and to this is ascribed the appearance of the abnormal constituents of the urine. These investigations demonstrate the influence of impure air upon the chemistry of the living cells of the animal body.

The chemistry of the absorption of foods offers an interesting chapter in the study of the activity of the animal cell. As practitioners of medicine we bestow much attention upon the subject of digestion. We administer acids and digestive ferments, often without effect. The manufacturing chemists flood the market with preparations of pepsin and pancreatine, with their so-called malted and digested foods, and I fear that we too often are deluded with the idea that it is only necessary to supply our patients with these ferments or foods in order to build up a worn-out body and restore strength to weak muscles and exhausted nerves. There is a popular—I fear that I might without any exaggeration say a professional idea—that peptones filter through the walls of the intestines without let or hinderance, and pour their treasures of strength and energy into the blood-vessels. However, scientific experiments have shown that this is altogether erroneous. In the first place albumin may be absorbed without having been previously converted into peptone. Voit and Bauer[15] washed out loops of the small intestines in living dogs and cats, ligated both ends of the loop, injected into the loop albuminous solutions, replaced the intestine within the body, and after from one to four hours determined the amount of albumin remaining in the loop. It was found that the amount absorbed during this time was, for egg-albumin from 16 to 33 per cent., and for acid albumin from muscles, from 28 to 95 per cent. Voit and Bauer think that they proved that there was no active digestive ferment in these loops by demonstrating that the portion unabsorbed contained no peptone.

The experiments of Eichhorst[16] have led him to the same conclusion, but the most positive evidence which we have on this point has been furnished by the investigations of Czerny and Latschenberger.[17] In a case of preternatural anus at the sigmoid flexure, it was found that albuminous solutions injected into the thoroughly washed piece of intestine below the fistula was absorbed after from twenty-three to twenty-nine hours to the extent of from 60 to 70 per cent. Without citing further experimental evidence upon this point it is sufficient to say that it has been conclusively shown that albumins may be, and often are, absorbed to a marked extent, without previous conversion into peptone. It should be understood that I do not claim that egg-albumin is ordinarily absorbed unchanged, but as Prior[18] has shown even this may occur when excessively large amounts of egg-albumin are taken in the food. (In such a case the albumin is not apparently utilized by the tissue, but acting as a foreign body, it is eliminated in the urine.) But there are many reasons for believing that in health a small part of our proteid food is never converted into peptones, but is fitted for its

[14] Zeitschrift f. physiologische Chemie, B. 15, S. 1891.

[15] Zeitschrift f. Biologie, B. 5, S. 562.
[16] Pflüger's Archiv., B. 4, S. 570.
[17] Virchow's Archiv., B. 59, S. 161.
[18] Zeitschrift f. Klin. Medicine, B. 18, S. 72.

service to the animal economy during its absorption through the walls of the intestines. The active agents which render this portion fit to enter the circulating blood are not the unorganized, digestive ferments, but are the living cells of the absorbing mechanism.

There are some good arguments in favor of the theory that all the proteid which is utilized in building or repairing tissue escapes conversion into peptones in the alimentary canal, and that proteids which have been converted into peptone can serve only as a source of energy, but cannot be utilized by the animal cell in the reconstruction of wasted muscles. If the defibrinated blood of one dog be injected directly into the veins of another the amount of urea eliminated by the latter is not materially increased, but if the defibrinated blood be administered by the stomach the increased amount of urea is large and in exact proportion to the quantity of the proteids in the blood administered.

A still more important fact is the demonstration that peptone is converted into serum-albumin during absorption. Should the peptones reach the circulation unchanged they act as poisonous bodies. Injected into the blood they are soon eliminated unless the quantity is sufficiently large to cause marked toxical effects. The conversion of peptone into albumin by the mucose of the walls of the alimentery canal has been beautifully shown by Salvioli working under the direction of the veteran physiologist, Ludwig. A loop of the intestine with the attached mesentery was taken from a dog. In the piece of the intestine there was placed one gram of dissolved peptone. Then the collateral branches having been ligated, a stream of defibrinated blood diluted with salt solution was caused to flow for four hours through the attached branch of the mesenteric artery. Duriug this time the fact that the cells of the intestine retained their vitality was shown by the active contractions of the piece. At the expiration of the given time there was no peptone either in the intestine or in the blood. A further experiment showed that peptone added to the injected blood did not disappear. Consequently the only conclusion which is warranted by the facts is that the peptone is converted into albumin during its passage from the lumen of the intestine into the blood.

That the living cells of the mucous membrane are essential to this conversion has been shown by destroying their vitality by dipping the piece of intestine into water at 60° C. After this has been done, the intestinal walls become in fact what it is generally supposed to be during life, a mere filtering membrane.

It is true that a very small per cent. of the peptone formed in the stomach and intestine is not changed into serum-albumin, but even this mall amount does not exist in solution in the blood, but is held by the white corpuscles. The reconversion of the fatty acids, set free by the action of the pancreatic juice, into neutral fats while passing into the thoracic duct is an equally important and interesting fact.

A case of elephantiasis of the left leg with a lymph fistula has recently supplied Munk and Rosenstein [19] with an opportunity of studying the absorption of fats, which has been very thoroughly utilized. From their studies of this case Munk and Rosenstein have reached the following conclusions:

1. The absorption of those fats, which are fluid at ordinary temperature, reaches its maximum between the fifth and eighth hour after a meal, while the maximum absorption of those, which are solid at ordinary temperature, is reached between the seventh and eighth hours. From these hours there is a rapid decrease in the amount of fat in the lymphatics until from the eleventh to the thirteenth hour, when the lowest point is reached.

2. When fatty acids are administered they reappear in the lymph for most part in the form of neutral fats. In this case the body must furnish the glycerine, which is necessary for the synthesis of the fatty acids into neutral fats.

3. The form in which the fat appears in the lymph is determined by the nature of its fatty acid. Thus, both olive oil (triolein) and oleic acid appear in the lymph as triolein, and both tripalmatin and palmitic acid appear as tripalmatin. On the other hand if a fatty acid combined with any other alcohol than glycerine be taken in the food the acid appears in the lymph as a glycerine compound. This was demonstrated to be the case by feeding the patient upon fats consisting of a fatty acid combined with amylic alcohol and at another time spermaceti, which consists of palmitic acid combined with cetylic alcohol. In both instances the fatty acids were found in the lymph in the form of glycerine neutral fats, while no trace of either the amylic or cetylic alcohol could be found in the lymph.

From these facts it is evident that the cells of the absorbing mechanism of the intestine synthesize the fatty acids and in every case the synthesis consists in a combination of the acid with glycerine.

There are many other interesting and valuable points brought out in this research, and I commend its study to you.

It will be seen from the above that all the problems of nutrition are not yet solved, and we are now in a position to at least know why we so often fail to build up an exhausted body by the administration of digestive ferments and predigested food. Indeed, I fear that we may sometimes do harm in our zeal which manifests itself in prescribing peptones indiscriminately. It is

[19] Virchow's Archiv. B. 123, S. 230 and 484.

more than likely fortunate that the majority of the so-called peptones in the market consist for the most part of acid albumins and are often wholly free from true peptones.

Here is another medical problem which demands chemical studies for its solution. What is the exact nature of the change whereby peptones are converted into serum-albumin? What are the conditions under which the cells of the mucosa act most energetically? Have we any medicinal agents which may affect this action favorably, or what is of equal importance, are we at present using any drugs which injuriously influence this activity? All of these, and many more which might be asked, are questions of great importance to us as practitioners of medicine.*

Whether or not the digestive ferments ever find their way in any considerable quantity into the blood I do not know. The older physiological chemists have taught us that both pepsin and pancreatin are normal constituents of the urine; but all the experiments upon which this statement rests were made before we had any knowledge of the bacterial ferments, and whether the peptic properties of the urine are due to ferments absorbed from the digestive organs or are products of bacterial activity in the urine after elimination, I think no one knows positively. However this may be, Hildebrandt has recently shown that the digestive ferments, when injected directly into the circulation or subcutaneously, are poisons of marked activity. The fatal dose of pepsin for dogs is from 0.1 to 0.2 grams per kilogram body weight. They produce an elevation of temperature which manifests itself generally within half an hour, reaches its maximum within from four to six hours and may continue for days. The day before death the temperature usually falls below the normal.

The chemistry of the liver has long been an interesting subject of study, and, while many important facts concerning it have been ascertained, there yet remains much for us to learn. We know that the liver converts ammonia, which should it reach the general circulation in any large quantity would be poisonous, into the practically inert substance, urea. In this organ the poisonous aromatic substances of the intestines, such as phenol, are rendered harmless by being conjugated with the alkaline sulphates.

In studying the changes wrought in the blood during its passage through the liver certain marked difficulties arise. The volume of this blood is so great that it is quite impossible at present to draw any conclusions from comparative analyses of the blood of the portal and that of the hepatic vein, except in the case of sugar. Frogs and birds live for some time after excision of the liver, or after it has been cut off from all communication from other parts of the body by ligatures, but in mammals this operation is followed immediately by death. By means of experiments upon birds, it has been shown that the bile pigments and acids are formed in the liver, the former from the hæmoglobin of the blood, and the latter by the conjugation of glycocoll and taurin with cholalic acid. It is believed that under certain abnormal conditions blood-pigment may be converted into bile-pigment outside the liver, thus giving rise to that form of icterus known as hæmatogenous or chemical, the existence of which, however, has been seriously questioned by the experiments of Vinkowski and Naunyn. Iron is a constituent of hæmoglobin but not of bilirubin. What becomes of the iron which is split off in this transformation in the liver is not known and remains as one of the problems of hepatic metabolism awaiting solution.

Of the chemistry of the nerve cell we know, as yet, practically nothing. Hodge,[20] in a very interesting series of experiments has shown that stimulation of a nerve going to a spinal ganglion is followed by marked morphological changes in the cells of the ganglion. The nuclei, after being stimulated for some hours, lose forty per cent. of their bulk; the cells themselves decreased but little in size, but their protoplasm became extremely vacuolated and the nuclei of the cell capsule shrunk to a noticeable degree. He has also noticed that after the stimulation has been discontinued the cells of the ganglion slowly recover their normal condition. Stress is laid upon the fact that this recovery is very slow, and this, we who have in charge patients who are nervously exhausted, can fully appreciate. There can be no doubt that these visible changes are accompanied by chemical reactions, a knowledge of the nature of which would be of great service, and this forms another of the problems which require chemical studies for their solution. The re-

*Macfayden, Neoricki and Sieber have recently (Archiv. f. exper. Pathol. and Pharm. B. 28, S. 311) made a valuable contribution to the study of digestion. On account of necrosis, due to an incarcerated hernia, an artificial anus was formed at the junction of the small with the large intestine, the excised piece consisting of 10 centimeters of the former and 3 centimeters of the latter. The patient rapidly recovered from the operation, ate all kinds of food and discharged the intestinal contents through the artificial anus for six months, after which time the surgeon joined the ends of the intestine and the natural anus again became the point of exit.

The most important points brought out in the study of this case may be condensed and stated as follows:

1. The contents of the small intestine are constantly acid and not alkaline as has been generally taught and believed.
2. The acidity is due to organic acids produced by the action of bacteria, or the carbo-hydrates of the food.
3. Bacteria were found constantly present in the small intestine.
4. These germs have but little effect upon proteids, but they produce organic acids and *alcohol* by their action on carbohydrates.
5. Skatol, indol, and phenol are not formed in the small intestine as has been supposed, but in the large intestine.
6. The same is true of the place of formation of hydrogen sulphide and methylmercaptan. Preparations of bismuth are not blackened in the small intestine.
7. A large amount of fluid injected into the rectum flowed out through the fistulous opening. This happened even when 100 grams of peptone dissolved in 100 cc. of water were injected in two portions. But five eggs, when rubbed up to a homogenous mass with a 0.6 per cent. solution of common salt (the whole measuring 250 cc.) were injected into the rectum in three portions were retained and absorbed.

[20] American Journal of Psychology, Vol. iii, 1891.

searches of Hodge supply a scientific basis for the rest treatment, inaugurated and practiced so ably by Weir Mitchell. When we can ascertain what food and what drugs, if any, best promote the recovery of exhausted nerve cells, another step in advance in treatment can be taken. However, this cannot be done until we ascertain the chemical alterations of which the observed morphological changes are but the outward manifestation.

I have thus briefly pointed out some of the important chemical studies of the nature and activity of the animal cell. The number of these might be multiplied many times. Indeed, in going over this part of the subject I have been embarrassed by the number of illustrations which could be offered, but I hope that these are sufficient to impress upon us a due appreciation of the possibilities which lie before us in this direction.

The Chemistry of Albumin.—Closely allied with the study of the chemistry of the animal cell is the investigation of the constitution of the albuminous molecule, for the latter is an essential part of the former. The researches of Schutzenberger[21] and others have made us familiar with some of the decomposition products of proteid bodies, especially with those obtained by the action of acids and alkalies. Kühne and Chittenden[22] have enlarged our knowledge of the digestive products, and the experiments of Schröder,[23] Minkososki,[24] and others have enabled us to trace some of the proteids through the animal body. Bechamp regarded urea as an oxidation of production of proteids, and thought that he had prepared the former by the action of potassium permanganate on the latter in alkaline solution. This was in accord with the doctrine of Liebig, who held that all the changes going on in the animal body are those of oxidation. However, Städeler and Loew repeated the work of Bechamp with negative results, and Lossen finally demonstrated that the substance which Bechamp had mistaken for urea is guanidine. Recently Drechsel has succeeded, as has been stated, in preparing urea from casein, and in doing so he has shown that it is not an oxidation, but a hydrolytic product.

Harnack[25] has obtained chemically pure albumin and has shown that its properties are quite different from those manifested by the impure bodies which we have hitherto studied. Maschke,[26] Schmiedeberg,[27] Ritthausen,[28] and others have formed crystalline proteids in various vegetable tissue, and Hofmeister[29] has given us a method of obtaining crystalline egg-albumin. With these advances it is within bounds to predict that the constitution of the albuminous molecule will soon be known. This will furnish us with the key to the arch of animal chemistry, and with this in hand, isolated facts already known, but the significance of which is not understood, will be easily placed in position, and many new and important ones will soon be discovered. The advice of Ludwig, "Study the albumins," is being followed, and will bear fruit in a better and more scientific understanding of tissue metabolism, and this will be followed by a more rational therapeutics.

A thorough study of the proteids is demanded at present, not only for the advanced physiological knowledge which it will give us, but in view of the fact that the most potent bacterial poisons belong to these bodies.*

The Value of Chemical Research in Pathological Studies.—Much of the pathological work of the future must be done by the chemist. In the first place certain chemical agents modify the growth and development of cells. This has long been known to be true in a few diseases. The influence of alcohol beverages in the production of certain abnormal conditions of the liver might be mentioned as an illustration. Chromic acid and the neutral chromates cause necrosis of the cells of the uriniferous tubules. The necrotic cells lose their nuclei, the cell protoplasm becomes a mere net-work and the dead cells from tube casts. Sodium indigotin sulphate injected into the jugular vein of a dog which has been treated with a subcutaneous injection of a chromate does not stain the injured cells of the tubules. Corrosive sublimate also destroys the nuclei of the cells of the uriniferous tubules and produces a pseudodiphtheritic combination of the intestines. At the same time, this poison produces marked changes in the medulla of the bones and induces a general anæmia. The effects of lead on the cells of the brain have been frequently observed: Vulpian[30] found colloid degeneration and atrophy with multiplication of the nuclei; while Monakow,[31] Oppenheim[32] and others have reported extensive degeneration and disappearance of the cells of certain ganglia. The karyolitic necrosis of the cells of the uniferous tubules caused by acetone has been described by Albertoni and Pisenti[33] and explains the albuminuria which oc-

[21] Bulletin de la Société Chim. T. 23, p. 161, et seq.
[22] Zeitschrift f. Biologie, B. 22, S. 423 et, seq.
[23] Loc. cit.
[24] Loc. cit.
[25] Berichte der Deutschen Chem. Geselschaft.

* The study of the products formed by the bacterial splitting up of proteids will probably be of service in ascertaining the constitution of the albumin molecule. Nencki has found that certain anaerobic germs produce from albumin the three aromatic acids: 1, phenylpropionic, 2, paraoxyphenylpropionic (hydroparacumaric), and 3, skatolacetic. From this he concluded that the albumin molecule contains preformed, not two, but three aromatic groups, tyrosin, phenylamidopropionic acid, and skatolamidoacetic acid. With this view accepted, the occurrence of the various aromatic substances, which have been found in the excretions and in putrefactive processes, becomes easy of explanation.

[26] Botanische Zeitung, 1859, S. 441.
[27] Zeitschr. f. physiology Chemic., B. 1, S. 205.
[28] Journal f. prak. Chemic., N. F. B. 25, S. 130.
[29] Zeitschr. f. physiology Chemic., B.
[30] Le cons sur les maladies du Syst. Nerv. T. 2, p. 267.
[31] Archiv. f. Psychatrie, B. 10, S. 495.
[32] Real-Encyclopedie von Eulonburg.
[33] Archiv. f. Exper. Pathol. und Pharm. B. 23, S. 392.

curs in severe cases of diabetes mellitus. The ill effects of some preparations of digitalis is explained by the well demonstrated, poisonous action of digitoxine on certain cells. The destructive effects of many chemical substances such as the arsenide of hydrogen, bile acids, etc., on the blood corpuscles is well known.

These and many other substances which might be mentioned, cause marked changes in the cells of the living body, and new interest is now attached to this point by the discovery of the fact that some of the ptomaines, those of cholera for instance, manifest their activity in this direction. Since it is now generally conceded that all pathogenic germs induce their characteristic effects by virtue of chemical poisons which the microörganisms elaborate, the chemist and histologist must become co-laborers in pathology. The bacteriologist will discover, isolate and study the life history of the germ. The chemist will isolate the active poisons produced by the germ. The physiologist will study the effects of these poisons. The histologist will make us acquainted with the morphological changes produced in various organs. Finally, let us hope, the therapeutist will gain from all these contributions some information which will make the practice of medicine both more scientific and more successful than it is today.

In the second place, we have positive proof that under some abnormal conditions the chemical activity of the living cell is perverted. This perversion may manifest itself, 1 by an abnormally abundant production of certain compounds, 2, by failure to produce changes which are affected in health, and 3, by the elaboration of new products.

The increased tissue metabolism of the acute fevers, in poisoning with phosphorous, arsenic, antimony, carbon monoxide and chloroform, and in carcinoma, are illustrations of the first of the above mentioned facts. In health the amount of nitrogen in the ingesta and that in the egesta are practically the same. This normal condition of "nitrogen equilibrium" is disturbed in the above mentioned abnormal states. The agent which causes this increased disintegration in the albuminous molecule is certainly not the same in all cases. In many, its character remains unknown and we must depend upon the researches of the chemist for information in this important field of pathology.

The abnormally large amount of uric acid and allied bodies in the urine in leucocythæmia is undoubtedly due to the increased number of nuclear cells, but what the active agents are which lead to the excessive formation of nuclear tissue we do not know. However, that they are chemical in character is suggested by the fact that a leucocythæmic condition is produced in some of the acute infectious diseases (diphtheria for instance) in which the actual *materies morbi* is a chemical poison.

The fact that cells under abnormal conditions may fail to elaborate their normal products is shown by the absence of hydro-chloric acid in the secretions of the stomach in cancer; while the appearance of acetic acid, oxybutric acid and acetone in the urine in diabetes mellitus is an illustration of the formation of new products in disease.

The causes of coma in diabetes, pernicious anæmia and carcinoma are unknown. That this coma occurs without any recognizable morphological lesion in the brain has been proved by Oppenheimer,[34] and the fact that all of these diseases are accompanied by increased metabolism of the nitrogenous tissue renders it highly probable that the nervous symptoms are due to the action of a chemical agent.[35]

THE TREATMENT OF THE FIRST STAGE OF ACUTE LOBAR PNEUMONIA.

Read in the Section of Practice of Medicine and Physiology, at the Forty-second Annual Meeting of the American Medical Association, held at Washington, D. C., May 5-8, 1891.

BY J. W. SMALL, M.D.,

OF NEW YORK, N. Y.

FELLOW NEW YORK COUNTY MEDICAL ASSOCIATION; FELLOW NEW YORK STATE MEDICAL ASSOCIATION; FELLOW AMERICAN MEDICAL ASSOCIATION; FELLOW NEW YORK ACADEMY OF MEDICINE.

In an editorial article in one of our leading medical journals an eminent writer has recently said that the "treatment of acute lobar pneumonia is still a reproach to our art, even more so than phthisis pulmonalis, and there is no subject which deserves more earnest study." To the truth of this statement every practical physician who reads the current literature upon this subject can testify. The pathology of this disease is indeed very well understood, but the diversities in the methods of treatment applied are almost as many as the physicians who employ them.

In presenting this subject for your consideration in this paper, I propose to deal only with the first stage, or that preceding the stage of red hepatization. The very simple treatment outlined does not, indeed, do any harm, but often much good, if used after the affected portion of the lung is solidified, but of that I do not propose to treat, but simply record the results of my own experience in treating the first stage as a local congestion and inflammation of lung tissue. So many methods have been tried and remedies used to abort this disease, that it would be impossible for me to enumerate all of them, but I will consider a few before describing the very simple method of treatment with which I have succeeded in ar-

[34] Churite Annuolen, 1888.

[35] It was the intention on beginning this paper to devote a considerable portion of it to the chemistry of therapeutics, but this subject is now reserved for a future paper.

resting it. And my method is so simple that I fear many of my professional brethren will throw this paper by with a feeling of contempt; yet not, I hope, until they have made a thorough trial of the method described. Is it not a fact, my brethren, that we are too apt to overlook those simple remedies and methods of treatment with which we are perfectly familiar, and reach out for these specifics with large-sounding names which are recommended by those high in the profession, and which we so often find to be fallacies that sadly disappoint us. The name of a Brown-Séquard or a Koch has a peculiar fascination for us, while the patient life-work of a humble practitioner, containing practical lessons of the richest value, is entirely overlooked and soon forgotten.

Probably the remedy which has been most frequently tried to abort this disease is quinine, given in doses of from 10 to 100 grs. and repeated *ad libitum*. This has no doubt been given with the idea that the disease is one of malarial origin. But Dr. J. H. Ripley, in a paper read before the New York Academy of Medicine, and reported in the *Boston Medical and Surgical Journal* for 1887, Vol. cxvi, p. 212, has shown us that he has found by careful experiments made at St. Francis' Hospital, that quinine does not abort the disease and does not act as an antipyretic, but has a bad effect upon the appetite and digestion, is liable to produce cardiac weakness, profuse cold perspiration and profound nervous debility. This testimony is corroborated by Dr. H. Corsen in the *Medical and Surgical Reporter* for 1887, Vol. lvi, pp. 644–647. My own experience has not been favorable to its use in the first stage of this disease.

Dr. H. S. Duncan, in the *Nashville Journal of Medicine and Surgery* for 1885, Vol. xxxv, pp. 154–160, recommends blisters on the affected side with calomel and veratrum viride. This treatment has been largely used by physicians, but never to my knowledge with the effect of shortening the disease, but may modify its severity. Dr. F. L. Benham, in the *Medical Times and Gazette*, London, 1885, Vol. i, pp. 73–76, makes an argument in favor of blood-letting and antimony —withdrawing at the first venesection from 10 to 12 ozs. of blood, and repeating the process in from twelve to twenty-four hours. This treatment is based upon the old-fashioned antiphlogistic theory of blood-letting for inflammation, but is not claimed to abort the disease, but simply modify it. To the employment of venesection in any form I should have very serious objections, as I consider it a measure calculated to produce extreme prostration of the system by depriving it of what little vital fluid is left after its depletion by the disease, and after the commencement of the second stage I regard it as positively dangerous.

Some writers in the *London Lancet*, and Dr. Frieandt, writing in *Duodecim*, a Finnish medical journal, have advocated the application of ice locally over the affected portion of lung by means of rubber bags filled with it, and giving opium expectorants and stimulants internally. With this treatment it is claimed that only three deaths occurred in one hundred and six cases, but it is not claimed that it materially shortens the disease.

In a case reported in the *London Lancet* for 1889, Vol. i, p. 730, Dr. H. E. Counsell shows the apparent abortion of pneumonia in its first stage in a patient aged 21 by a single dose of 15 grs. of antipyrin given at bedtime. As this is the only case which I can find recorded where the inflammation has been broken up, and as it so much resembles many of my own cases, I have strong hope that this class of antipyretics may render valuable assistance in the treatment of this disease.

I will now give in detail my own theory and practice in this disease; one which I have used for twenty years and in several hundred cases, and, when the patient has been seen before the second stage, with always the result of breaking up the disease within twenty-four or forty-eight hours.

Upon the causation and pathological character of pneumonia all medical authorities are well agreed. Previous to that time when the air cells become occluded with an inflammatory exudation consisting of fibrillated fibrin, pus cells, red globules and changed epithelial cells, the affected portion of lung tissue is in a state of active congestion or pulmonary engorgement. Could we examine the fine capillary blood-vessels of the alveoli and minute bronchi, we would find them distended to their utmost capacity with blood, venous blood, which instead of passing through the pulmonary circulation and becoming oxygenized, remains localized, thus impeding the process of respiration and taking on inflammatory action. The temperature of the affected portion of lung is far above normal; its action is obstructed so that it is impossible for the blood to become aerated, and the only relief which can possibly come to the overburdened lung tissue is that which Nature offers by throwing into the alveoli and bronchi the inflammatory products of the blood, thus placing the affected part at rest while Nature takes time to undo the mischief she has wrought in her efforts for self-preservation. But is there no way to bring relief to the overburdened lung except the one which Nature adopts? I answer positively, yes. There is a way, and a certain way, to remove this localized congestion, if made use of before these pathological changes have taken place which fill the alveoli and bronchi with inflammatory products, and it is accomplished upon the well known principle that congestions within the thorax or abdomen are always relieved by actively stimulating the venous and arterial capillary blood-vessels upon the surface of the body and at the extremities. This active stimulation

of the surface capillaries quickly removes from the part the blood pressure by bringing the blood to the surface of the body and thus equalizing its circulation. In order to accomplish this practically I have prepared a tub or pail partially filled with hot mustard water. Seating my patient on a chair, or the edge of the bed, I have him thoroughly covered with blankets. Then I have the feet, legs, thighs and arms thoroughly rubbed with the hot water, using it as hot as it can be borne and gradually working the feet into it, rubbing them until quite red; then putting the patient into bed and covering warmly with blankets, with a rubber bag or jug filled with hot water at his feet. I then have made three large, hot poultices of flaxseed meal, or rye flour well sprinkled with mustard and a little ginger and covered with a piece of thin muslin. One I have placed over the thorax in front, one behind, between the shoulder blades, and the third upon the affected side over the region of the pain. I keep my patient well covered with an extra quantity of bed clothing, being very particular to have him keep his arms and hands well covered, and watch results. In from one-half hour to two or three hours he will be in a profuse warm prespiration, and in from twelve to fifteen hours the pulse, respiration and temperature will be reduced to nearly normal. In the great majority of cases I believe this treatment alone sufficient to break up the congestion and pyrexia if adopted early. But it has usually been my practice as soon as my patient is in bed after the foot bath to give a powder composed of equal parts of nitrate of potassa and Dover's powder—for an adult five grains of each, and repeat in three hours if free prespiration does not occur. I have recently obtained good results from a powder of fifteen grains of antipyrin used once, but not repeated, as I have found the repetition apt to produce an unfavorable action upon the stomach and great depression. In fifteen minutes after giving the powder I commence with tr. aconite rt., in doses of from gtt. ss. gtt. iss., with spts. æth. nit. gtt. xv and water to one teaspoonful. These doses I give every half hour or hour as the urgency of the case demands until I have given six or seven doses, then repeat at intervals of two hours. With children, instead of the poultices of flaxseed and mustard, I have used onions and lard with excellent results. In other respects their treatment has been precisely similar. This treatment, when used early, I have never known to fail, and I have sometimes used it with success two days after the initiatory chill. When called to a patient in the afternoon or evening I have found the next morning the pulse reduced from 120 to 80 or 85, the temperature from 103° to 99° and all symptoms of fever disappearing within the next twenty-four hours.

THE TREATMENT OF SPASMODIC ASTHMA.

Read in the Section of Practice of Medicine and Physiology, at the Forty-second annual Meeting of the American Medical Association, held at Washington, D. C., May 5-8, 1891.

BY J. F. JENKINS, M.D.,
OF TECUMSEH, MICH.

In dealing with this subject, it will be unnecessary for me to enumerate the many remedies which are in vogue in the treatment of this obstinate and distressing disease; neither will it be necessary to mention the beneficial results which are often produced upon the patient's health by a change of climate.

My object in the preparation of the paper is to bring to your notice a remedy which has, within the last few years, been prescribed for the purpose of mitigating the attacks of asthma. The remedy alluded to is euphorbia pilulifera, a plant which grows by the way-side in Australia, and which, according to Australian medical literature, has been used as a domestic remedy in the treatment of asthma and bronchial affections by the inhabitants of that island.

The universal experience of all who have practiced the healing art for a number of years is, that old and tried remedies frequently fail to give relief, and we are frequently driven from one remedy to another, in order to mitigate the sufferings of a patient who is undergoing an attack of spasmodic asthma, and who is bound to get relief, if not from the profession, he will seek the advertised charlatan, or the quack nostrums of the day.

In order to make my remarks as brief as possible, and to make this paper practical without being verbose, it will be necessary to give the clinical history of a few of the cases which have come under my observation, and have been treated by this drug.

Case 1.—George S., age 45 years. Came under my observation January 9, of this year. He states that he has had frequent attacks of asthma during the past ten years, years, and during the last three years, the paroxysms have been more frequent and severe. After a careful examination of the chest, there was no evidence of structural changes in either heart or lungs. The kidneys were in a healthy condition, the appetite good, and the bowels regular. In fact, he was in the enjoyment of good health (as he expressed it), if it were not for these periodical attacks of asthma. He was ordered a mixture of equal parts of the fluid extract of euphorbia pilulifera and glycerine, with directions to take a teaspoonful every four hours during the day, and to report in the course of a week or ten days. When he returned to my office, he stated that he slept well at night; has had no return of paroxysms of asthma; found one or two teaspoonfuls

a day sufficient to ward off the attacks. States that he has not slept so well for years.

This patient has been under observation up to within a few days, and has been thus far relieved from the annoying paroxysms of asthma.

Case 2.—Mrs. Z., age 50 years. An American by birth. Has usually had fair health, but during the past seven years has had frequent attacks of asthma. During the past year, she states that the attacks have been more frequent and severe, especially during the autumn and spring. No organic disease of either heart or lungs could be detected upon examination of the chest. There were no structural changes in the kidneys. Appetite and digestion fair. This patient had been previously under treatment for asthma, and at that time the paroxysms were mitigated by a combination of grindelia robusta and iodide of potassa. At this time she was given a mixture of the fluid extract of euphorbia pilulifera and glycerine, equal parts, of which she was to take a teaspoonful every four hours during the day, and in the course of a week to report. When the patient returned to my office she stated that the paroxysms of asthma had ceased under the influence of the medicine, and that she had rested quietly all night in the recumbent posture, while heretofore it was impossible to sleep without being propped up in bed.

Case 3.—Mrs. A., age 43 years, weight about two hundred pounds. American by birth. Has frequent attacks of asthma. Heart and lungs sound. Appetite and digestion good. Suffers more from asthmatic attacks during autumn and winter than any other seasons of the year. Frequently obtains relief by inhaling the fumes of burning nitre of paper. Prescribed the fluid extract of euphorbia pilulifera and glycerine, equal parts, of which the patient was to take a teaspoonful every three hours. Her husband reported that the medicine had no effect on the paroxysms of asthma, and that his wife's asthmatic breathing was relieved by smoking cubeb cigarettes.

Case 4.—Miss R., age 13 years, has suffered from asthma from early childhood. Has received treatment from all sorts of physicians, from the cultured physician as well as the travelling mountebank, and has obtained very little benefit from any of them. No organic disease could be detected of either heart or lungs, upon examination of the chest. No structural changes in the kidneys. Appetite and digestion fair, and the patient well nourished. She was prescribed a mixture of equal parts of the fluid extract of euphorbia pilulifera and glycerine, with directions to take a teaspoonful morning, noon, and night. Her mother reports that the daughter has breathed better, and suffered less from asthma than at any period for several years.

Within the past year thirteen cases of spasmodic asthma have come under treatment, and in each case the fluid extract of euphorbia pilulifera has been prescribed with satisfactory results, except in one or two cases where it failed to relieve, although no cause could be assigned for its failure. There were no complications, but the drug failed, like many others which have a decided influence in the treatment of spasmodic asthma. In one instance, where mitral lesions were present, a pill containing one one-hundredth of a grain each of trinitrin and strophanthin, night and morning, in connection with half a drachm of the fluid extract of euphorbia pilulifera every four hours during the day, gave the patient relief from the paroxysmal attacks of asthma, which were no doubt of neurotic origin.

Finally, permit me to briefly state the conclusions arrived at by Dr. John Aulde, of Philadelphia, who has prescribed euphorbia pilulifera in twenty-five cases of spasmodic asthma: "Euphorbia is a remedy of special value in the treatment of all forms of asthma. In the absence of organic changes in the pulmonary and renal structures, and when the atmospheric conditions are favorable, relief will usually be afforded after taking the first dose. Being excreted largely by the liver and kidneys, the condition of these organs must be taken into consideration when estimating the probable effect of the drug. It has no special action in controlling the sudden attacks, but may be depended upon in young and robust individuals to effect a radical cure, providing they will continue to reside in an atmosphere that is dry and bracing, situated in a moderately elevated locality, where there are no, or comparatively few, sudden changes."

FOREIGN CORRESPONDENCE.

LETTER FROM LONDON.

(FROM OUR OWN CORRESPONDENT.)

The late Mr. Richard Middlemore—The Statistics of the German Government on the Koch Remedy—The Oldest Living Surgeon—Prof. Victor Horsley on Hydrophobia—The Effects of Fog on the Manchester Atmosphere—Discussion on Strangulated Hernia—Report of the Trustees of the Peabody Fund.

Mr. Richard Middlemore, of Birmingham, who died in his eighty-seventh year, was a leading ophthalmist, and author of a treatise regarded as the handbook of ophthalmology, to promote the knowledge and practice of which in Birmingham he contributed with his efforts and his purse. In 1877 he founded a prize to be awarded triennially by the Council of the British Medical Association, for the best essay on "The Scientific and Practical

Value of Improvements in Ophthalmic Medicine and Surgery."

Official reports on Dr. Koch's much contested remedy somewhat correct the reaction which has set in against the treatment. The German Government has obtained statistics from fifty-five hospitals, where during eight weeks 2,172 patients were treated with 17,500 injections of the lymph. The maximum injections for one person were fifty-four, and the largest dose 3.826 grams. Of 1,061 patients suffering from internal tuberculosis 13 were cured, 171 much improved, 194 slightly improved, 586 no better, and 46 died. Out of 708 sufferers from external tuberculosis 15 were cured, 148 much improved, 237 slightly improved, 298 no better, and 9 died. Owing to the reported failures, the "tuberculin" is in little demand from the Berlin chemists, while at Madrid the committee appointed to examine the treatment have checked any further experiments. The only success reported from Spain is stated to have been with lepers and persons suffering from lupus of the face.

Mr. William Salmon, of Prullyne Court, Cowbridge, Glamorganshire, has just attained his 101st birthday. Mr. Salmon is the only known centenarian Freemason, and there can be little doubt that he is now the oldest member of the craft. Mr. Salmon is also thought to be the oldest living member of the Royal College of Surgeons. He was born March 16, 1790.

Professor Victor Horsley has given a discourse at the Royal Institution on "Hydrophobia." The professor began by remarking that it was Pasteur who first proved that hydrophobia was due to a "germ." These germs, when numerously developed in a dog, might be communicated by the saliva, but it had been observed that dropped saliva speedily lost its power of communicating rabies on drying. The time from inoculation to the development of the disease was not less than six weeks, but it might be two years, and it was this dreadful suspense that formed one of the horrors of receiving a bite from a dog suffering from rabies. Professor Horsley considered there were two well-marked, distinct forms of hydrophobia, the excitable and the comatose. In rabbits it always took the comatose form. Dogs might have either form, and at the Brown Institute and the Dog's Home he had studied both forms. In the furious form an animal, however domesticated, runs away, and it was by these stray dogs that the disease was spread. The professor gave some details of the symptoms a dog shows, and alluded especially to the entire change in appetite. The professor pointed out that wherever the muzzle had been long in force the disease had been stamped out. A diagram for English deaths showed that there was a fall in deaths from rabies after 1885, when the muzzle was obligatory, and a rise after 1886, when the order was withdrawn. There was also a fall after 1889, when the muzzle was again ordered. The experience of Vienna was the same. Prussia had maintained the muzzle, and had but two deaths when in England there were eighty. He hoped the Government would re-order the muzzle. When rabies had once developed there was no known cure. Pasteur's method of inoculation, he said, had saved 94 per cent. of bitten people from having rabies.

The effects of fog have been very disastrous this winter on the Manchester atmosphere. According to observations taken during three days of fog, nearly six hundred weight of sulphuric acid per square mile was deposited around the Infirmary, besides two hundred weight of hydrochloric acid and two tons of blacks. The leaves of plants growing out of doors near the hospital yielded a deposit of from 6 to 8 per cent. of sulphuric acid, and 5 to 7 per cent. of hydrochloric acid.

In a discussion at the recent meeting of the Royal Medical and Chirurgical Society on the treatment of strangulated hernia when the intestine is gangrenous or ulcerated, Mr. Treves, referring to the occasion in 1885 when Mr. Mitchell Banks had brought up the same subject, said everyone must have been struck with the remarkable differences of opinion then expressed. No doubt this was due, he thought, to the fact that in any individual's experience such cases were comparatively rare. The statistics of mortality between the old method and primary resection were not comparable. The first series with a mortality of 90 per cent. was absolutely perfect, being taken straight from hospital records, but the second, taken from McCosh's tables, with a mortality of 50 per cent., were selected cases. Mr. Treves thought the mortality after resection was at least 90 per cent., for if the mortality after resection was only 50 per cent. it would be about the same as that of the ordinary operation. It was highly improbable that it was no more dangerous to resect than to to open the sac. Surgical instinct was always opposed to resection, although the two first recorded cases—the first by Ramdorh, in 1727, and the second by Arhand, in 1732, which represented the old method, were both perfectly successful. Mr. Dean, of the London Hospital, looked up for him the cases of strangulated hernia which he had operated upon; there were 73 in all. Of these six were gangrenous and all had died. Two were left on account of there being general peritonitis. In one the bowel was opened and in the others the whole of the gangrenous parts, two inches, three inches, and eighteen inches respectively he had resected. In McCosh's tables the average duration of the operation for resection was from one and a half to two hours, and often had to be performed when the parts were bathed in putrid pus. He thought that in

acute intestinal obstruction the less done the better the result, as the patients were not dying of gangrene but of obstruction. Mr. Treves went on to say that he had come to the conclusion that the best and simplest way was merely to open the sac and divide the stricture so as to relieve the obstruction. If the intestine was found to be gangrenous it should be brought gently down and attached by sutures to the abdominal wall and then either open the gut or let it open itself. To pull down the gut he had found to be a very dangerous proceeding.

To read the twenty-sixth annual report of the trustees of the Peabody Fund is to realize what a gigantic work it is to properly house the poor of London. Mr. Peabody's benefactions amounted to a total of £500,000. To this round sum the trustees have added by way of rent and interest £523,446, and they have expended in all, including money borrowed, £1,233,845. The result is the provision of 11,275 rooms occupied by 20,462 persons. The average rent paid is 2s. 1¾d. As a rule the health of the model dwellings is better than that of London generally, but owing to the epidemic of last spring, from which many of the tenants suffered, the death-rate in 1890 is slightly above the average of the metropolis.

The Chair of Anatomy at the Royal Academy has been conferred upon Mr. William Anderson, of St. Thomas' Hospital. Mr. Anderson was for some years medical director of the Imperial Medical College of Japan, and is well known as the author of a classical work upon the early Japanese artists.

The Hospitals' Association has just established their fiftieth street ambulance station in the portico of the Royal Exchange. The Association is now largely extending its organization and the committee have under consideration the establishment of twenty-seven additional stations suggested by the chief commissioner of the metropolitan police, on the recommendations of the superintendents of the different divisions. These stations are in various quarters of the metropolis, but mainly in the East End, in which district the association's organization is as yet least complete. The completion of these new stations will see the whole of London furnished for the first time with a complete street ambulance service.

TO REMOVE THE PIGMENTATIONS OF PREGNANCY.

In the *Journal de Médecine de Paris*, January 4, 1891, the following ointment is recommended to be rubbed into the affected parts twice daily to remove the pigmentations which so often disfigure pregnant women:

℞. Cocoa butter.
Castor oil, āā ʒ ij¼.
Oxide of zinc, gr. v.
Yellow oxide of mercury, gr. ij.
Essence of roses enough to perfume.

STATE MEDICINE.

Michigan State Board of Health.

The annual meeting of the Michigan State Board of Health was held at the Capital, Lansing, Mich., April 14, 1891. Prof. Fall, Drs. Avery, Hazlewood, Vaughan and Baker were present. Dr. Avery was reëlected president.

DR. VAUGHAN reported that, at the State Laboratory of Hygiene, he has made analyses of all the different kinds of baking powder found in the market, also of one hundred and twelve samples of water from different parts of the State, and that he was ready to report the results, also of his researches on typhoid fever.

DR. BAKER reported that he had worked out the cause of influenza. He said its greatly increased prevalence during the last three months is alarming because so many other diseases follow that disease, and increase after it increases, the diseases which so increase being consumption, pneumonia, cerebro-spinal meningitis, rheumatism, osteo-myelitis, etc., influenza seeming to bring in its train all of these most important diseases. Dr. Baker explained the causation of influenza. He stated that the germs of influenza are generally, at all times, present, and the germs of pneumonia, tuberculosis, and of the other specific diseases are somewhat widely disseminated; but that there must be certain coincident meteorological conditions to irritate the throat and air-passages sufficiently to let the germs gain an entrance to the body. These meteorological conditions in this instance, were the excessive prevalence of north and north east winds, and the excessive amount of ozone during the past three months.

The prevention of influenza and of the coincident rise in the other more dangerous diseases, has not been possible, because of ignorance of the causes. Now the causes are known, and the study of the measures for the prevention can begin.

How to get more thorough disinfection after contagious diseases, was brought up by Dr. Hazlewood, also by letter from Dr. Nicholson, of the Upper Peninsula, and also by other correspondence of the office of the board. It seems to be made plain that, if the Bill now before the Legislature (Senate Bill 257, House Bill 640) shall become a law, making a small appropriation to enable the State Board of Health to send an inspector to the localities where most needed, to aid in the final disinfection after cases of dangerous diseases, the spread of those diseases can be very greatly lessened, and hundreds, and possibly thousands of lives can be saved in Michigan in every year.

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LONDON OFFICE, 57 AND 59 LUDGATE HILL.

SATURDAY, MAY 23, 1891.

THE ADJOURNED MEETING OF THE TRUSTEES.

The Trustees of the Association met in Chicago on Wednesday, May 13th, all being present except Dr. Shoemaker, who was represented by proxy. The question of appointment of Editor being taken up, Dr. J. C. Culbertson, for many years editor of the *Lancet and Clinic* of Cincinnati, was placed in nomination and received the unanimous vote of the Trustees.

Dr. Culbertson was also instructed to act as Business Manager.

On Thursday, May 14th, the Trustees, in company with the newly elected editor, inspected THE JOURNAL office, and he was formally placed in charge.

The Trustees bespeak for Dr. Culbertson the same kindly consideration that has been extended to his predecessors, and they feel sure that the results of the new management will show the wisdom of their selection.

By direction of P. O. Hooper, President of the Board. JOHN B. HAMILTON, Secretary.

MEDICINE AND THEOLOGY.

It is in the best sense commendable for every physician to join some church of his choice, and by example and act, do all he can to build up the higher life of the community, and also encourage its ethical culture and growth. When the physician becomes a church partisan, and ardent defender and propagator of certain creeds or doctrines, he must to some degree lay aside his scientific training and reputation. When, on the other hand, the physician ignores all church influences, and assumes skepticism and doubt, sneering at all church efforts, and teachings of the Bible, he very clearly exhibits his narrow judgment and scientific incompetency.

The physician should never forget that he should be a student of all science, in the broadest meaning of that term. In that position he must accept the general facts and principles of theology, as clearly settled as any other knowledge in the world. He may not be convinced of this or that form of church doctrine, or interpretation of Biblical teachings, but he should ever hold the subject open for further evidence, and always show a readiness to hear all sides of the topic.

The majority of medical men have long ago taken this position, and where they do not become active members of some regular church, are reverential believers and supporters of the fundamental principles of Christian religion. It is only the minority, which happily are growing less every year, who are skeptics, and who hide their weakness under the pitiful expression of *Agnosticism*. These men are always urging the idea of conflict between science and religion, which every true student of science denies, and every new truth of nature flatly contradicts. Learned theologians and scientists find no conflict or clash of the great truths of nature and theology; only the small, weak, half-learned men are troubled by such possibilities.

Medical men are more fortunately situated than others to realize and understand the higher ranges of physical and physiological laws, which are active in the formation of life and character, and the many unknown forces which enter into the religion of life in its higher sense. We believe no class of professional men are more reverential and so profoundly impressed by the operation of nature's laws, and the spirit forces of the world.

A noted New York surgeon whose reckless, abrupt manner was the subject of comment, was giving a clinical lecture when the patient suddenly died. Being a jocular man, who saw the grotesque in all things, every one was hushed in expectation of some remark. He stood silent a few moments, then turned to the class with tears in his eyes, and in a choked voice said: "You

have witnessed a phenomenon which will be a reality to each one of you, some day. If you are true men and live right, it will be welcomed, and not dreaded," and walked out.

These remarks are suggested by the sad comment of a noted college President, that medical men are becoming more skeptical and dangerous to the growth of ethical truth. In reality this is the exact opposite of the facts. Statistics will show that more physicians are both active and passive church members, than ever before. In every town and city in the country medical men will be found actively supporting almost every Christian and philanthropic movement for the elevation of the people. The real students of all the writings of DARWIN, HUXLEY, SPENCER and others, will never be skeptics or obstructionists to ethical truth. The half-learned are the only dangerous men. Medicine and theology will never be in conflict or suffer except from this class. Both medicine and theology are rapidly changing, and breaking away from much of the narrow superstition of the past.

The province of the physician is more and more a teacher, and less a dealer of drugs. The clergyman is coming nearer the physician, and both are pointing out and applying the higher laws of physical and spiritual life, and urging men to live in accordance with them. The highest form of theology points out the realm of the spiritual, from the physical, and shows the laws and forces which govern the life here and hereafter; and the highest form of medicine indicates the reign of physical laws, their scope and influence, over organic and tangible life.

While theology carries the range of study farther on, it is no less obscure or doubtful than medicine of to-day. The dogmatic medical man who assumes that he possesses positive knowledge of physiology, pathology and therapeutics, is on the same range of the theologian who teaches the completeness of all spiritual truth. Both are incompetent to judge of the range of study of the other, and both fail to comprehend the spirit of truth, or understand the great principles of evolution and growth, and human conceptions of truth.

The unfortunate church war which is going on in an Eastern city, in which a number of physicians have become involved, has no medical or theological significance, but merely reflects the weakness of both sides, and can result in no possible good whatever. Toleration, generosity, a spirit of benevolence, and full recognition of the right of private belief, should exist in both clergymen and physicians. Happily this is the rule, of which only a few exceptions occur. The clergyman and physician should draw nearer with every advance of science. The mutual influence of one upon the other would go far towards elevating the race and lessening the tides of disease and misery.

THE PROBLEM OF WATER PURIFICATION.

Perhaps the most important sanitary question now pressing for solution is that of a pure water supply for our towns and cities. As this country becomes more populous, the streams and lakes receive more refuse and sewage, until the purification of the water supply for a given locality has become the crying need. Statistics show that at least 55 per cent. of the waters supplied to cities and towns are obtained from surface sources and are necessarily liable to more or less contamination. Various remedies have been sought for this condition, the most practical thus far suggested is to prevent the contamination, by carefully guarding the lakes or rivers from which the supply is obtained. It is at once apparent that only a certain degree of security is reached in this way, as it is clearly impossible to perfectly guard an extended water shed.

Aside from organic or infectious pollution, surface waters frequently contain fine particles of inorganic matter in suspension, or they are more or less discolored and so rendered unsightly and distasteful. This is especially true of many river waters, even when they are wholesome so far as health is concerned. Natural springs with deep wells have been considered the best sources of water supply, but unfortunately their range is limited and they offer no practical solution of the water supply of our larger towns. If we consider for a moment the sources of spring water we find that it was originally precipitated upon the surface, but as it percolates through the sand, gravel and stratified rocks it gradually looses its suspended matter and becomes clear and sparkling. The earth acts as a great natural filter and waters found at any considerable depth are usually free from dangerous contamination, unless there has

been sufficient pollution of the surface to extend some depth into the soil.

In the treatment of polluted waters this natural process should as far as possible be imitated, and we believe that it is precisely upon these lines that the solution of our water supply problem is to be reached. Filtration, however modified, has always been based upon one principle, that of forcing water through a substance with pores sufficiently fine to entangle the suspended organic and inorganic matter. Almost every conceivable porous substance has, at one time or another, been used in filtering water. These, however, may be divided into two classes: first, those consisting essentially of a porous plate or bed, such as sandstone or unglazed porcelain; and secondly, those in which a porous mass is formed by a substance in a fine state of subdivision, such as sand, gravel or charcoal. So far as we know, the first class have never been used on a large scale, though good results have been obtained where but a limited supply of water is required. The chief objection to filters of this class is that the interior of the bed or plate cannot be cleaned. Laboratory experience shows that bacteria soon make their way through plates of this kind. A further serious objection is that they cannot be adopted for the filtration of water upon a large scale.

The sand filter in its various modifications is the only one that has been adopted in the filtration of waters for towns and cities. Excellent results may be obtained by simple beds of sand, allowing the water to flow over the surface and percolate through to a suitable collecting chamber below. Filters arranged upon this plan purify most of the water supplied to the city of London. The chief objection to gravity sand filters is their great size, and cost of maintenance. The outer layer of sand must be removed every few days and fresh sand substituted; and, unless the bed is carefully prepared and the water evenly distributed over the surface, crevices will form, through which the water flows without filtration.

A modification of the sand filter is one in which the bed is surrounded by a shell, and the water is forced through by hydraulic pressure; this force if sufficient forms the sand into an evenly resistant compact mass, comparable to a very soft sand-stone. A filter constructed upon these principles and filled with fresh clean sand will give a pure sparkling water for some hours, but the outer layers soon become foul and clogged, and little or no water can be passed through; it is therefore necessary to either renew the sand, or to have some means of thoroughly and efficiently cleaning it. It is just at this point that inventors and engineers have failed. It is apparent that a filter constructed upon such principles, if the bed cannot be thoroughly cleaned, is worse than useless, it becomes indeed a positive source of danger; it is this defect that has rendered some of the devices now on the market worthless.

It has been demonstrated that a simple bed of sand arranged in this way will remove all suspended matter and most of the bacteria. Can we not look for mechanical devices that will easily and cheaply cleanse this sand? This once accomplished, one of the greatest sanitary problems of the age will be solved, and public health have taken a long step in advance.

EDITORIAL NOTES.

Some of the ways adopted by other large assemblies and organizations may be profitably imitated in future meetings of the American Medical Association, as indicated by the ease with which ill-digested resolutions are sometimes passed in our general sessions suggests the necessity of having in amendment to the By-Laws of the Association, whereby *all* resolutions before being voted upon, shall have been previously introduced and referred to a committee on resolutions. By having such a committee it would be quite impossible to pass resolutions under the spur of insufficient time for consideration. Nobody would be wronged by such a course, for the committee by the terms of its organization should be required to report back to the Association, either by favorable or adverse report, all resolutions referred to them not later than the morning hour of the last day of the session.

To be Tried Under the Code.—A San Francisco physician, member of the San Francisco County Medical Society, read a paper before that body and the following day extensive abstracts of his contribution appeared in the daily public press, presumably with his knowledge, consent and assistance. Charges were promptly brought against him for a violation of the Code of Ethics, and his trial was set for an early date.

AMERICAN MEDICAL ASSOCIATION.

Forty-second Annual Meeting, held at Washington, D. C., May 5-8, 1891.

FOURTH DAY—FRIDAY, MAY 8.

The President called the Association to order at 10 A.M.

Prayer was offered by Rev. Dr. John H. Elliott, D.D.

The Permanent Secretary read the names of the committee to petition Congress, as per resolution, on a Secretary of Public Health.

Committee: C. G. Comegys, Chairman, Ohio; J. F. Hibberd, Indiana; N. S. Davis, Illinois; J. C. Culbertson, Ohio; T. G. Richardson, Louisiana; Wm. B. Atkinson, Pennsylvania; Chas A. Lindsley, Connecticut; C. A. Hughes, Missouri; Wm. T. Briggs, Tennessee; H. D. Didama, New York; Thos. B. Evans, Maryland; Alex. J. Stone, Minnesota; J. P. Logan, Georgia; W. W. Kerr, California; Chas. Denison, Colorado; W. L. Schenck, Kansas; P. O. Hooper, Arkansas; H. J. Swearingen, Texas; Wirt Johnson, Mississippi; Thos. F. Wood, North Carolina; J. N. McCormack, Kentucky; J. T. Reeve, Wisconsin; H. O. Walker, Michigan.

Officers of Section on Obstetrics and Gynecology—Chairman, E. E. Montgomery, Pa.; Vice-Chairman, Bedford Brown, Va.; Secretary, F. H. Martin, Ill.

The following resolution was unanimously adopted by the Section:

Resolved, That in the future the papers to be presented to this Section shall be limited to forty, and the chairman shall have full discretionary power in selecting such papers from those offering.

Dr. Thos. F. Wood, N. C., read the report of the Committee on the Centennary of Vaccination. (Report not received.)

On motion of Dr. J. F. Hibberd, Ind., it was

Resolved, That the Committee on the Jenner Centennial be continued for another year, and that at the next annual meeting of this Association the Committee report, naming suitable persons, known to be students of vaccinology, to form a standing committee to whom the whole subject be entrusted, and that the 14th day of May, 1896, be chosen and set apart as the day upon which we will celebrate the centennial of the discovery of vacinnation.

Resolved, Further, that the meeting of this Association for 1896 be so arranged as to include the above date.

REPORT OF COMMITTEE ON PRESIDENT'S ADDRESS.

Dr. Culbertson, Ohio, presented the following:

Your Committee, to whom was referred the suggestions contained in the President's Address, beg leave to recommend the adoption of the following resolutions:

Resolved, That all business matters of the Association be referred without discussion or comment to an executive committee composed of two members to be appointed by each State Society in affiliation with this Association, who shall carefully consider and recommend such action thereon as they may deem most advisable.

Resolved, That the time of meeting of the Sections be from 9 A.M. to 12 M. and from 2 to 6 P.M., and that the time of the general sessions shall begin at 12 M. and continue until adjournment.

Signed, P. O. HOOPER,
J. C. CULBERTSON,
LEARTUS CONNOR,
HENRY O. MARCY,
HAROLD N. MOYER.

This was laid over as an amendment to the By-laws.

Dr. A. L. Gihon offered an amendment to the By-laws, making Wednesday the day for the delivery of the President's address.

THE INCORPORATION OF THE ASSOCIATION.

Dr. Harvey Reed, Ohio, offered the following:

WHEREAS, The American Medical Association has never been incorporated, and has in consequence no legal existence, therefore be it

Resolved, That a committee of seven be appointed by the President to proceed at once to procure its incorporation; and that said committee of incorporation be and are hereby instructed to name the Judicial Council of this Association for the Trustees of said incorporation.

A motion of Dr. J. E. Woodbridge, Ohio, to lay this on the table was negatived.

After much discussion, on motion of Dr. J. F. Hibberd, Ind., the motion was amended to read that the committee be appointed to devise a plan for the incorporation of the Association and report their action at the next annual meeting.

The question then being on the amendment as amended, Dr. Hibberd offered as a substitute for all that was before the house,

That a committee of seven be appointed to devise a plan of incorporation and report next year.

This was unanimously adopted.

The Permanent Secretary announced the presence in the house of Mr. W. Taylor, President of the American Pharmaceutical Association, and Prof. Joseph Remington, a delegation from that body, and mentioned the fact that Mr. Taylor had been engaged in work on the Pharmacopœia for forty years. On motion these gentlemen were invited to seats on the platform.

Messrs. Taylor and Remington were received and accorded seats, and Prof. Remington earnestly thanked the Association for their courtesy and for the formation of the Section of Materia Medica and Pharmacy, as follows:

WHEREAS, The American Medical Association has organized a Section of Materia Medica and Pharmacy, and has invited twenty-five members of the American Pharmaceutical Association to meet with them and discuss questions of mutual interest. The Section having been duly organized, and numerous papers having been read and subjects considered, to the satisfaction and benefit of the members attending, it is therefore

Resolved, That the delegation from the American Pharmaceutical Association express their high sense of appreciation of the action of the American Medical Associa-

tion, and sincerely trust that the movement which has been inaugurated so auspiciously may redound to the advantage of the professions of medicine and pharmacy.

The Permanent Secretary, in the absence of Dr. W. L. Schenck, Kans., arose to read the *Address on State Medicine*. On motion of Dr. J. G. Kiernan, Illinois, it was read by title.

Dr. F. Woodbury, Pennsylvania, from the Section of Materia Medica and Pharmacy, offered the following:

Resolved, That the Government of the United States be memorialized by the American Medical Association in favor of the plan proposed by Dr. F. E. Stewart, whereby the valuable work of the laboratories of the Army, Navy, Marine-Hospital Service, Smithsonian Institution, Customs Service, Agricultural Department and other departments of the public service, *in the line of identification and analysis of drugs* may be facilitated and made of more general utility, by the publication of their results, so that the information thus gathered may be disseminated for the general benefit of the professions of medicine and pharmacy.

On motion this was adopted.

Dr. Wm. H. German, Illinois, offered the following:

Resolved, That a committee of three be appointed by the President, to report at the next general session of this Association, to draft a memorial for presentation to the Congress of the United States, in accordance with the suggestion of the Hon. John C. Ross in his Address of Welcome to this Association, asking that the common law be so amended that confidential communications between physician and patient shall be respected in the same manner as those between attorney and client.

On motion of Dr. Kiernan this was adopted.

The report of the Section on State Medicine, by Dr. Benjamin Lee, Pennsylvania, was read by the Permanent Secretary and accepted.

A paper by Dr. W. W. Parker, Virginia, on *Intelligence in Man and Animals*, was offered and read by title.

The Permanent Secretary announced the officers of the Sections for next year as follows:

Practice of Medicine—Chairman, ———; Secretary, ———

Surgery and Anatomy—Chairman, J. McF. Gaston, Georgia; Vice-Chairman, M. Price, Pennsylvania; Secretary, W. F. Mann, Michigan.

Medical Jurisprudence and Neurology—Chairman, H. N. Moyer, Illinois; Vice-Chairman, J. E. Emerson, Michigan; Secretary, G. D. Strawbridge, Pennsylvania.

Obstetrics and Diseases of Women—Chairman, ———; Secretary, ———

Diseases of Children—Chairman, E. F. Brush, New York; Secretary, B. A. Waddington, New Jersey.

Dermatology and Syphilography—Chairman, L. D. Bulkley, New York; Secretary, J. C. McGuire, District of Columbia.

Oral and Dental Surgery—Chairman, J. Paft, Ohio; Secretary, E. S. Talbot, Illinois.

Otology and Laryngology—Chairman, ———; Secretary, ———

Ophthalmology—Chairman, ———; Secretary, ———

Materia Medica and Pharmacy—Chairman, Frank Woodbury, Pennsylvania; Secretary, W. L. Whelpley, Missouri.

State Medicine—Chairman, Benjamin Lee, Pennsylvania; Secretary, L. F. Flick, Pennsylvania.

Physiology and Dietetics—Chairman, C. H. A. Kleinschmidt, District of Columbia; Secretary, ———

A motion to amend the title of the Section of Neurology, etc., by adding Psychiatry, was laid on the table by a large vote.

Committee on Medical Aid Association (Resolution by Dr. Horner), Frederick Horner, U. S. N.; Benjamin Lee, Pennsylvania; John H. Hollister, Illinois.

The report of the Judicial Council having been asked for Dr. N. S. Davis, explained that time was needed to investigate the matters referred, and the report would be offered at next session.

Dr. I. N. Love, Missouri, moved that it be the sense of this Association that Dr. W. W. Potter should have no hesitation in serving on the Board of Trustees.

The President decided this not in order.

As several members had applied to be appointed delegates abroad, the President, after some remarks on the subject, announced that he would appoint them to all save the British Medical Association.

After some discussion, and a motion that no appointments be made to the British Medical Association, on motion the whole subject was laid on the table.

On motion of Dr. J. E. Woodbridge, Ohio, the President and Permanent Secretary were authorized as usual to issue credentials abroad to such societies as were deemed proper.

The Permanent Secretary read the following:

PROCTOR, VT., May 6, 1891.

DR. N. S. LINCOLN, Washington, D. C.

My Dear Sir:—Am very sorry not to be in Washington this week to be of any help in my power in entertaining the medical society, but I find it impossible to be with you. Very truly yours,

REDFIELD PROCTOR.

On motion of Dr. W. K. Sheddon, Tennessee, it was

Resolved, That the thanks of the Association were tendered to the local committee of arrangements, and the other physicians and citizens of Washington, to the trustees of the different museums and art galleries, and to the hotels and railroads for their many kindnesses and favors shown to the members during their stay here, and that this motion be passed by a rising vote.

The vote was adopted by the entire assemblage rising.

Dr. J. E. Woodbridge, Ohio, said:

"It has been my good fortune to have attended many meetings of the American Medical Association, but never before have I seen the As-

sociation so honorably and agreeably, yet so firmly and well presided over as at the present meeting, and the duties of the President and of the Permanent Secretary so satisfactorily performed, therefore I move that the thanks of this Association are due and are hereby tendered to Dr. Briggs, of Tennessee and Dr. Atkinson, of Pennsylvania." Carried unanimously.

The President then introduced Dr. H. O. Marcy, Massachusetts, the President-elect, who accepted the duties of his office in a speech alluding to the venerable ex-presidents, Drs. Bowditch, and Storer, both of Boston, Mass., in terms of profound respect and regret that they had not been with the Association this year.

On motion of Dr. F. Woodbury, Pennsylvania, it was

Resolved, That the Permanent Secretary be directed to send telegrams to our venerable ex-presidents, Drs. Henry I. Bowditch and D. Humphreys Storer, of Boston, expressing the high esteem in which we continue to hold their former labors in the American Medical Association, and of our continued personal regard; and greatly regret that they were unable to be present with us at the present meeting.

The retiring President, Dr. W. T. Briggs, then alluded to the pleasure he had enjoyed in presiding over the meeting, thanking the members for their support and bade them good bye and God speed.

On motion of Dr. N. S. Davis, the Association then adjourned to meet in Detroit, Mich., on the 1st Tuesday of June, 1892.

WILLIAM B. ATKINSON,
Permanent Secretary.

LIBRARIAN'S REPORT.

Mr. President:—I have the honor to present the catalogue of additions to the Library of the Association during my term as Librarian of the American Medical Association.

This report shows the addition of 45 Periodicals, 24 Reports of various kinds, 14 Society Transactions, 5 Hospital Reports, 16 Dissertations and Papers, and 8 College Announcements.

I would suggest, on account of the crowded condition of the library—one of the towers of the Smithsonian Institute Building—that other quarters be selected for its habitat. The tower is now overcrowded, the shelving space all used up, and the new material must be piled, layer over layer, on the floors, where it is not only inaccessible, but where no one cares to seek it. I would also suggest that the subscription to the *Index Medicus* for the current year be continued, and the sum of $10 be appropriated for that purpose.

CATALOGUE OF ADDITIONS TO THE LIBRARY OF THE AMERICAN MEDICAL ASSOCIATION, BY DONATION, EXCHANGE AND SUBSCRIPTION, FROM MAY 1, 1890, TO MAY 1, 1891.

REPORTS.

Consular Reports (U. S.), Nos. 114–125.
Consular Report, Special. Fruit Culture in Foreign Countries, 1890.
Consular Report, Special. Carpet Man'f. in Foreign Countries, 1890.
Consular Report, Special. Malt and Beer in Spanish America, 1890.
Consular Report, Index, 1890.
American Statistical Association, Report, 1890.
Biological Laboratory of Johns Hopkins University, Report, Vol. iv, No. 7, 1890.
Bureau of Education, Reports, 1890.
Foreign Relation of the United States, 1889.
Illinois State Board of Health, Report, 1890.
Index Catalogue of the Library of the Surgeon-General's Office, U. S. A., Vol. xi.
International American Conferences, Report and Recommendations, 1890.
Red Cross Society, Report, 1890.

COLLEGES.

Alumni Association, Philadelphia College of Pharmacy, 1890.
Baltimore University, Annual Announcement, 1891.
Baltimore Medical College, Announcement, 1891.
National University, D. C., Annual Announcement, 1890.
McGill University, Canada, Annual Announcement, 1891.
Tulane University, Louisiana, Annual Announcement, 1890.
University of Pennsylvania, Philadelphia, Annual Announcement, 1890.
Women's Medical College, Philadelphia, Annual Announcement, 1890.

DISSERTATIONS AND PAPERS.

Baker, Henry B., Sanitation in 1890.
Bishop, S. S., Imperfect Auditory Canal, 1890.
Boylan, J. E., Simple and Effective Method of Anæsthetizing the Pharyngeal Tonsil.
Bulkley, L. D., Psorospermosis Follicularis Cutis.
Bulkley, L. D., On Dangers arising from Syphilis in the Practice of Dentistry.
Cutter, Ephraim, Food in Motherhood.
Eastman, Jos., Abdominal and Pelvic Surgery.
Johnson, J. T., Abortion and its Effects.
Judson, A. B., A Criticism of Willett's Operation for Talipes Calcaneus.
Goner, A. J., The Causes and the Remedies for Suits for Malpractice.
Lamphear, New Treatment of Peritonitis.
Morton, Wm. J., The Franklinic Interrupted Current.
Remondino, P. C., Longevity and Climate.
Senn, Two Cases of Resection of Cæcum for Carcinoma.
Senn, Diagnosis and Operative Treatment of Gun-Shot Wounds of the Stomach and Intestines.
Johns Hopkins University, Studies from Biological Laboratory, Vol. v., No. 1, Vol. iv., No. 5.

HOSPITALS.

Butler Hospitals for Insane, Report, Providence, 1890, 1891.
Johns Hopkins, Vol. ii, No. 1, 1890.
New York Hospital and Bloomingdale Asylum, 1889.
Northampton Lunatic Hospital, No. 21, 1890.

PERIODICALS.

Belgium—Archives Médicales Belges.
Canada—Canada Medical Record.
Montreal Medical Journal.
L'Union Médical du Canada.
France—Archives de Médécine Navale.
Journal de Médécine et de Chirurgie.
Sweden—Nordiskt Medicinskt Archiv.
United States—Alienist and Neurologist.
American Journal of Insanity.
American Lancet.
American Practitioner and News.

American Veterinary Review.
Archives of Dentistry.
Atlanta Medical and Surgical Journal.
Buffalo Medical and Surgical Journal.
Cincinnati Medical News.
Columbus Medical Journal.
Denver Medical Times.
Dietetic Gazette.
Gaillard's Medical Journal.
Index Medicus.
International Dental Journal.
Journal of the American Medical Association.
Journal of Balneology and Dietary.
Journal of Nervous and Mental Diseases.
Medical Age.
Medical Brief.
Medical Bulletin.
Medical Standard.
Medical Summary.
Medical World.
Nashville Journal of Medicine and Surgery.
New England Medical Monthly.
New Orleans Medical and Surgical Journal.
New York Medical Journal.
North Carolina Medical Journal.
Notes on New Remedies.
Pacific Medical Journal.
Physician and Surgeon.
Pittsburgh Medical Review.
St. Louis Medical and Surgical Journal.
Southern Clinic.
Southern Practitioner.
University Medical Magazine.
Virginia Medical Monthly.

SOCIETIES.

France—Bulletin de l'Academie de Médecine.
Bulletin et Memoires de la Société Med. des Hôpitaux de Paris.
Bulletin de la Société Clinique de Paris.
Germany—Physikalisch Med. Societät in Erlangen, 1890.
Great Britain—Obstetrical Soc. of London, Transactions, Vol. xxxi, Part iii and iv, 1889.
Obstetrical Soc. of London, Transactions, Vol. xxxii, Part i, ii and iii, 1890.
Pathological Society of London, Transactions, Vol. xli, 1890.
United States—American Association of Obstetricians and Gynecologists, Trans., Vol. iii, 1890.
American Gynecological Society, Trans., Vol. xv, 1890.
Iowa State Medical Society, Vol. viii, 1890.
Medical Society State of New York, Trans., 1890.
Medical Society, New Jersey, Trans., 1890.
New York State Pharmaceutical Assn., 1890.
S. Carolina Med. Association, Trans., 1890.

SOCIETY PROCEEDINGS.

Fort Wayne (Ind.) Academy of Medicine.

Regular Session, March 30, 1891.

DR. L. K. MCCULLOUGH read the paper of the evening, entitled

SHURLY'S TREATMENT.

The essayist gave an outline of the present treatment of Shurly and Gibbes, and appended the history of four cases. The essayist suggests that inasmuch as chlorine gas is irrespirable, producing spasmodic closure of the glottis, it would not penetrate the bronchial tubes of medium calibre, to say nothing of the air cells; that if chlorine gas is necessary to prevent caseation and the formation of the ptomaine toxalbumin, it might be gotten into the tissues through rectal insufflation.

Case 1.—Mrs. C., æt. 33 years, since birth of last child, eighteen months ago, has been in failing health. January 3, is in last stage of phthisis. Daily injections of iodine for ten days, and five more on alternate days; inhalation of chlorine gas caused so much distress that it was abandoned. Patient was better subjectively, objectively no improvement. Now failing rapidly, and will soon die.

Case 2.—I. A., cigar maker, æt. 27. Family history good. For past fourteen months patient thinks he has been out of health. Has had three separate hæmorrhages; slight cough; general condition fair; appetite good. Dec. 29, right lung no abnormal signs; on left side infra-clavicular space gave tubular breathing; dulness on percussion and crackling râles on deep inspiration. Temp. 99.5°; no expectoration. Iodine injections daily, gr. $\frac{1}{20}$, increased to $\frac{1}{10}$, given for fifteen days. No chlorine inhalation. Beechwood creasote gr. $\frac{2}{3}$ t.i.d. Hypophosphites and malt were used. Patient has gained eight pounds in weight. Coughs scarcely any, temp. normal, physical signs improved, but probably due to disappearance of local congestion.

Case 3.—Æt. 25; incipient stage; treatment two weeks; no change.

Case 4.—J. P., æt. 38; tubercular history; husky voice; congestion of larynx for past two years; sputum shows bacilli. Lost a brother recently from phthisis. Expectoration very profuse. Since treatment expectoration has ceased, till at present time can not get enough for examination. Chlorine gas inhalations not used. Chloride gold was used for a time but was was discontinued on account of pain and nodulation at site of puncture. Arytenoid ragged; no abscess has followed injections; rubbing relieves pain of puncture.

DR. PROEGLER said he was acquainted with case 4, and the tubercular history is undoubted. Since six weeks patient has improved very rapidly. Gold injections makes patient feel very tired. At present there is no expectoration; no night-sweats; appetite improving, and now walks several blocks where before was unable to go out. Right lung has cleared up and râles not appreciable. Patient had continued beechwood, creosote, hypophosphites and malt.

DR. WHERY: It would be difficult to say that results were due entirely to injections. Am better impressed with Shurly's treatment than with Koch's because it produces no reaction.

DR. SCHILLING: Have had no experience with the Shurly method.

DR. WHEELOCK: Am interested indirectly in the treatment on account of the possibility of curing those secondary tubercular affections of the eye found in patients with phthisical antecedents.

DR. MCCASKEY: Have had some experience with iodine injections, but not enough to base a definite opinion upon. Maximum dose of iodine as used by essayist seems small. I think it may be safely carried to ½ gr. My injections have been followed by pain, hence I use sol. cocaine. The treatment shows that irritating injections may be used with perfect safety and without danger of suppuration.

DR. PROEGLER: I think there is a psychical element in the injections, and that after the weary routine of reconstructives the injections act upon the mind as well as physically.

DR. MCCULLOUGH: Am not prepared to offer any opinion as to the real value of the treatment, and can not till more statistics have been brought forward.

BOOK REVIEWS.

DIE WIRKSAMKEIT DES KOCHSCHEN HEILMITTELS GEGEN TUBERCULOSE.

For some years it has been the custom of the minister of medical affairs in Germany to issue a year book, in which are published the official reports of the directors of different clinics. This volume forms a supplement for the regular volume and contains thirty-three reports of the results obtained with Koch's method up to the close of December, 1890, or about eight weeks' experience—too short a time to come to any conclusion as to the permanent value of the method. The majority of opinions are more or less favorable as to the diagnostic and therapeutic value of the method, but in many instances an opinion is reserved or guardedly expressed. Of 1,010 patients with tuberculosis of the internal organs who were subjected to the treatment, only 13 are said to have recovered, 365 were benefited, 586 remained stationary, and 46 died. Of the 13 cases reported cured, 10 were in the first stage, and 267 of those reported improved were either in the first stage, or else the disease had made but little progress.

PIPERAZIDINE AS A SOLVENT FOR URIC ACID.

It is stated in a German pharmaceutical journal that piperazidine dissolves uric acid more readily than any other substance of a basic nature. Urate of lithia requires 368 times its own weight of water to dissolve it, but urate of piperazidine dissolves in fifty times its weight of water. It may therefore be expected that this drug will become a fashionable, let us hope, too, an efficient remedy in gout and allied diseases.

NECROLOGY.

Necrology Report for the State of Connecticut.

Hartford County.—The following members of the State Medical Society have died during the year: Geo. E. Markham, East Hartford; R. B. Watkins, So. Manchester; J. S. Butler, Hartford; S. W. Rockwell, So. Windsor; Casper Barstowe, E. Hartford.

Tolland County.—Joel Addington Warren, M.D., born at Irisburgh, Vt., February 15, 1834; died at Ellington Corner, December 25, 1890. Graduated from the Albany, N. Y., Medical School in 1859.

Fairfield County.—James R. Cumming, M.D., of Bridgeport.

New London County.—Robert A. Mainwaring, M.D., of New London; died September 1, 1890.

Respectfully submitted,

W. A. M. WAINWRIGHT, M.D.

Sidney Allan Fox, M.D.

The following memoir of the late Dr. Sidney Allan Fox, member of the Kings County Medical Association, was read at the stated meeting, March 10, 1891:

Dr. Sidney Allan Fox died of pneumonia, at his residence, 22 Cambridge Place, Brooklyn, on Saturday, January 10, 1891, aged 34 years, 6 mos. and 26 days. He was born at Mount Sterling, Ky., graduated from the University of Kentucky, and pursued the study of medicine at Bellevue Hospital Medical College, New York City, receiving the diploma of that institution in 1880.

He served one year each as interne in the Charity Hospital and the New York Hospital for the Relief of Ruptured and Crippled, and came to Brooklyn in 1882. He was Surgeon to the Brooklyn Elevated R. R., and Surgeon in Chief to the Brooklyn Dispensary for the treatment of the Diseases of the Nose, Throat and Lungs. He joined this Association in January, 1888, and always took an active interest in its proceedings. He was especially interested in the diseases of the respiratory system. By his death the Association has lost a valuable member, and the profession one of the ablest of its younger men. The members of this Association unite in expressing their profound regret at the death of Dr. Fox, and tender to the bereaved family their sincere sympathy.

WM. WATERWORTH,
F. C. RAYNOR,
Committee.

Richard Gundry, M.D.

Dr. Richard Gundry, a member of the faculty of the Baltimore College of Physicians and Surgeons, died at Spring Grove, Md., on April 23, 1891. He was born in England, near London, about sixty-two years ago, the son of a talented clergyman. In 1845 he went to Canada, and soon afterwards began his medical studies. He graduated five years later from the medical department of Harvard University. He began medical practice at Rochester, N. Y., but in 1854 removed to Columbus, O., to become an assistant physician in the Lunatic Asylum. In 1857 he went to Dayton to occupy a similar position, and became Superintendent of that institution in 1862. He was afterwards identified with the care of the insane at Athens, O., and again at Columbus, and later at Catonsville, Md. Dr. Gundry superintended the building of two or more large asylums, and was the author of numerous reports on improving the care of the insane. After his removal to the vicinity of Baltimore, he accepted the chair of materia medica, therapeutics and mental diseases in the college above named. His final illness was due to Bright's disease.

MISCELLANY.

In our last issue the name of Dr. J. C. LeGrand, of Alabama, should appear instead of Lagrange, as member of the Nominating Committee.

New York Post-Graduate Medical School and Hospital.—At the meeting of the Directors of the New York Post-Graduate Medical School and Hospital, H. J. Boldt, M.D., was made Professor of Diseases of Women, William James Morton, M.D., Professor of Electro-Therapeutics and Aug. Caille, M.D., Professor of Diseases of Children. Clarence C. Rice, Secretary.

South Dakota State Medical Society.—The tenth annual meeting of the South Dakota State Medical Society will be held at Chamberlain, South Dakota, on Wednesday, Thursday and Friday, June 10, 11 and 12, 1891. Members of the medical profession are cordially invited to attend.

Program.—Business sessions will be held at Masonic Hall, Wednesday, June 10, 1891, 8 P.M. Call to order. Prayer, Rev. D. B. Nichols, M.D. Address of Welcome, Mayor John T. Anderson. Response, W. E. Duncan, M.D. President's Annual Address, J. W. Freeman, M.D. Report of Committee of Arrangements.

Thursday, A.M. Report of Censors and Admission of New Members. Appointment of Committees. Report of Secretary. Report of Treasurer. Report of Standing Committees. Reports of Delegates to American Medical Association and other Societies.

Sections.—Report on Medicine, Dr. I. R. Spooner, Chairman. Report on Medicine, Dr. C. J. Cummings, Secretary.

Report on Surgery, Dr. G. W. Moody, Chairman. Report on Surgery, Dr. S. J. Coyne, Secretary.

Report on Obstetrics and Diseases of Women, Dr. H. VanBuskirk, Chairman. Report on Obstetrics and Diseases of Women, Dr. A. H. Bowman, Secretary.

Report on Nervous Diseases, Dr. S. B. McGlumphy, Chairman. Report on Nervous Diseases, Dr. H. H. Stoner, Secretary.

Report on Hygiene, Dr. S. A. Brown, Chairman. Report on Hygiene, Dr. J. B. Graham, Secretary.

Thursday, P.M. Report on Endemic Diseases, Dr. Fred. Treon, Chairman. Report on Endemic Diseases, Dr. R. E. Buchanan, Secretary.

Report on Microscopy, Dr. H. S. Sevey, Chairman. Report on Microscopy, Dr. G. E. Martin, Secretary.

Report on Diseases of Children, Dr. F. B. Bullard, Chairman. Report on Diseases of Children, Dr. F. P. Smith, Secretary.

Report on Diseases of Eye and Ear, Dr. A. Shaw, Chairman. Report on Diseases of Eye and Ear, Dr. W. J. Nolan, Secretary.

Report on Dermatology and Venereal Diseases, Dr. M. Ware, Chairman. Report on Dermatology and Venereal Diseases, Dr. R. T. Dott, Secretary.

Report on Vital Statistics, Dr. F. A. Spafford, Chairman. Report on Vital Statistics, Dr. O. O. Sawyer, Secretary.

Report on State Legislation, Dr. W. M. Kaul, Chairman. Report on State Legislation, Dr. A. H. Tufts, Secretary.

Papers.—Laceration of Cervix Uteri, Trachelorrhaphy, and relation to Conception and Pregnancy, Dr. J. S. Johnson.

Ophthalmology and its Relation to General Practice, Dr. A. Shaw.

Diseases of Children, Dr. F. B. Smith.

Also papers by Drs. I. R. Spooner, F. A. Spafford, S. J. Coyne, W. J. Nolan, O. W. Phelps, G. W. Moody, J. B. Graham, S. B. McGlumphy. Volunteer Papers and Report of Cases.

Thursday Evening. Unfinished Business. Report of the Nominating Committee. Election of Officers. Appointment of Committees and Sections for Ensuing Year. Reading of the Minutes. Adjournment.

Officers.—President, Dr. J. W. Freeman; Vice-President, Dr. M. Ware; Second Vice-President, Dr. A. H. Tufts; Secretary, Dr. R. C. Warne; Assistant Secretary, Dr. S. L. Halverson; Treasurer, Dr. J. C. Morgan.

Trustees.—Dr. F. Andros, Dr. S. B. McGlumphy, and Dr. F. B. Bullard.

Committee of Arrangement.—Dr. R. H. Goodrich, Dr. S. L. Halverson, Dr. May, Dr. Cook, Dr. Lloyd.

Notes.—Article III of the Constitution, Section 4: "Permanent members shall be regular practitioners of medicine in the State, shall be graduates of a medical college in good standing, shall be members of the local society where they reside where such society exists. . ."

"Every application shall be accompanied by the sum of $3.00 membership fee. . . ."

The society has largely increased as to membership and attendance the past few years, and the interest in our society work has increased in proportion. It is wished that all the physicians in the State will join in the good work.

The railroads refuse reduced rates so that each one will probably find it the best to buy round trip tickets.

The hotels—"Hotel Taft," "Wright House," "Brule House," and "Merchants House,"—kindly make a rate of $1.50 per day.

Capt. H. J. King extends an invitation to the society for a pleasure trip on the Missouri river sometime during the meeting.

The committee on arrangements promise all a good time.

The Golden Belt in the Capital City of Kansas.—The Golden Belt District Medical Society of Kansas convened in regular quarterly (annual) session in the club rooms in the National Hotel, in Topeka, April 9, in response to an invitation by the physicians of the capital city, who entertained the visitors royally and attended the sessions in a body. The attendance was very large and the programme unusually interesting, especially so by virtue of the liberal discussions of the papers read, the cases reported, and the difficult operation performed by Dr. Emory Lanphear, of Kansas City, Mo., who exhibited great skill as operating surgeon in demonstrating upon a dog recent improvements in intestinal surgery. The programme carried out was as follows:

Dr. J. H. Garvey, of Wisley, "Chronic Cystitis with Report of Cases."

Dr. C. H. Guibor, of Topeka, "Report of Cases of Adenoid Growths in the Throat."

Dr. Emory Lanphear, of Kansas City, Mo., "Some Recent Improvements in Intestinal Surgery, with Demonstrations upon a Dog."

Dr. H. Cordier, of McPherson, "Phimosis, Local and Remote Results."

Dr. Chas. W. Adams, of Kansas City, "Peri-Uterine Inflammation."

Dr. P. Daugherty, of Junction City, President, "Annual Address."

Dr. L. H. Berger, of Kansas City, "Use of Obstetric Forceps."

Dr. Hal. Foster, of Kansas City, "Report of a Case of Submucous Hæmorrhage of the Larynx."

This being the annual meeting, officers for the ensuing year were elected as follows:

President, Dr. Wm. B. Dewees, of Salina.

First Vice-President, Dr. Z. T. Harvey, of Council Grove.

Second Vice-President, Dr. T. N. Gunn, of Chapman.

Secretary, Dr. F. B. Browne, of Salina.

Treasurer, Dr. E. Kauffman, of Abilene.

The new president was introduced formally by the retiring president who, upon taking the chair, made a brief address in which he thanked the members for the honor conferred upon him. A vote of thanks was tendered the retiring president. It was agreed by vote to accept the invitation of the retiring president to hold the next meeting at Junction City in July. The Golden Belt is one of the three most prosperous societies in the State of Kansas. The attendance at this meeting numbered over seventy, and included a large number of the leading practitioners and teachers of medicine in Kansas, and five from Kansas City, Mo. The meeting was the most interesting and profitable one in the history of the Society.

NEW YORK STATE MEDICAL ASSOCIATION, FIFTH DISTRICT BRANCH.—The seventh annual meeting of the Fifth District Branch will be held in Wurzler's Building, 315 Washington street (over the Post Office), Brooklyn, on Tuesday, May 26, 1891.

The morning session will be called to order at 11 A.M., and will be devoted to the

President's Address, "Opiates in the Treatment of Acute Peritonitis."

Business of the Branch.

Biographical sketches of the late Dr. James Bathgate, by John Shrady, M.D.; Dr. W. N. Blakeman, by Mr. A. N. Blakeman; Dr. John P. Garrish, by W. T. White, M.D.

Scientific papers on

"Cathartics in the Treatment of Acute Peritonitis," by A. Palmer Dudley, M.D.

"The Treatment of Hydrocele by Carbolic Injection versus the Radical Operation," by Samuel E. Milliken, M.D.

Adjournment at 1 P.M. for lunch.

The afternoon session will be called to order at 2 P.M., and will be devoted to the remaining scientific papers:

'Scarlatinal Diphtheritis and its Treatment," by E. G. Rave, M.D.

"Practical Results of the Operation for Lacerated Cervix Uteri," by H. W. Mitchell, M.D.

"Objections to the Ordinary Axis-traction Instruments, also the Advantages of the Use of the Anticraniotomy Forceps over Version in Pelvic Deformities, by T. J. McGillicuddy, M.D.

"A Case of Obstinate Neuralgia Following Fracture Relieved by Operation," by Reginald H. Sayre, M.D.

"Acute Prostatitis and Prostatic Abscess," by William R. Ballou, M.D.

The Nominating Committee will then make its report of members of the Executive Committee for the ensuing year.

The present accumulation of interest from the Permanent Fund will enable the Branch to furnish lunch to all in attendance without charge.

LETTERS RECEIVED.

Albany, N. Y., Dr. A. Marsh.
Alexandria, S. Dak., Conlin & Maytum.
Alma, Wis., Dr. Geo. Seiler.
Ashland, Me., Dr. Kinney.
Baltimore, Md., Dr. H. Friedenwald.
Boston, Mass., Damrell & Upham.
Charlton, Ala., Dr. T. T. Glover.
Chicago, Ill., Dr. S. C. Plummer, Dr. J. M. Dodson.
Chilhowee, Mo., Dr. C. T. Sweeney.
Cincinnati, O., A. W. Whelpley.
Claytona, O., Dr. John Kraps.
Cleveland, O., Dr. H. W. Quirk.
Clinton, Ill., M. Goodbrake.
Cohoes, N. Y., Dr. B. Egan.
Columbus, O., Siebert & Lilley.
Columbus, Texas, R. C. Stafford & Co.
Denver, Colo., Dr. W. G. Sprague.
Detroit, Mich., Dr. T. A. McGraw, Park, Davis & Co.
Fairfield, Ia., Dr. J. V. Bean.
Fitchburg, Mass., Dr. A. W. Sidney.
Galena, Ill., Elce Bros.
Grand Rapids, Mich., Dr. L. A. Roller.
Hyde Park, Ill., The Tyndale Eucalyptus Co.
Irving Park, Ill., Dr. Ed. Pynchon.
Jackson, Tenn., Dr. W. F. Rochelle.
Justin, Texas, R. J. Allison.
Louisville, Ky., Cal. Fig Syrup Co.
Lyons, Neb., Dr. M. L. Hildreth.
Minneiska, Minn., Dr. D. F. Brooks.
Morgansfield, Ky., Dr. J. W. Muir.
Morristown, Ind., Dr. F. F. Whetzel.
Mount Vernon, N. Y., Dr. E. S. Tuley.
Nashville, Tenn., Dr. W. T. Briggs.
New York City, G. E. Stechert, Dr. A. E. Rockey, Dr. F. H. Wiggin, J. H. Bates. Geo. P. Rawell & Co., Douchy & Co.
Oak Cliff, Texas, Dr. R. G. Williams.
Onargo, Ill., Dr. W. M. Barritt.
Philadelphia, University of Pa. Press, Dr. C. B. Warder, Dr. R. J. Dunglison, Dr. J. H. Packard.

Official List of Changes in the Stations and Duties of Officers Serving in the Medical Department, U. S. Army, from May 9, 1891, to May 15, 1891.

Lieut. Col. James C. McKee, Surgeon, having been found incapacitated for active service by an Army Retiring Board, is, by direction of the Acting Secretary of War, granted leave of absence until further orders on account of disability. Par. 11, S. O. 106, A. G. O., Washington, May 9, 1891.

Capt. Henry P. Birmingham, Asst. Surgeon, the extension of the ordinary leave of absence granted in S. O. 81, A. G. O., April 10, 1891, from this office, is changed to leave of absence on account of sickness, to date from May 1, 1891. By direction of the Acting Secretary of War. Par. 4, S. O. 108, A. G. O., May 12, 1891.

Lieut. Col. Dallas Bache, Surgeon, is relieved from duty as a member of the Army Medical Examining Board, New York City, and will return to his proper station, Omaha, Neb., and resume his duties as Medical Director, Dept. of the Platte. By direction of the Acting Secretary of War. Par. 5, S. O. 108, A. G. O., May 12, 1891.

Official List of Changes in the Medical Corps of the U. S. Navy, for the Two Weeks Ending May 16, 1891.

P. A. Surgeon W. H. Rush, detached from "Saratoga" and prepare for sea.

P. A. Surgeon S. W. Atlee, detached from Navy Yard, League Island, and to "Saratoga."

Asst. Surgeon C. De W. Brownell, ordered to Navy Yard, League Island, Pa.

Surgeon T. H. Streets, detached from Naval Examining Board and prepare for sea.

Surgeon B. S. Mackie, ordered as member of Naval Examining Board.

P. A. Surgeon L. W. Curtis, detached from Naval Academy and to the Practice ship "Constellation."

P. A. Surgeon Philip Leach, orders to U. S. Practice ship "Constellation" revoked.

Surgeon G. P. Bradley, detached from "Mohican" and placed on waiting orders.

Medical Inspector T. C. Walton, Surgeon Geo. A. Bright, and P. A. Surgeon J. M. Steele, ordered to Naval Academy to examine applicants physically for admission.

Surgeon S. H. Dickson, ordered to the "Constellation."

P. A. Surgeon W. H. Rush, detached from "Saratoga," and await duty to sea.

P. A. Surgeon L. W. Atlee, detached from Navy Yard, League Island, and to the "Saratoga."

Asst. Surgeon C. D. W. Brownell, ordered to Navy Yard, League Island.

Official List of Changes of Stations and Duties of Medical Officers of the U. S. Marine-Hospital Service, for the Three Weeks Ending May 9, 1891.

Surgeon H. W. Austin, detailed as chairman of Board for physical examination of candidates for appointment, Revenue Marine Service. May 9, 1891.

P. A. Surgeon P. M. Carrington, granted leave of absence for twenty-three days. May 5, 1891.

P. A. Surgeon W. D. Bratton, when relieved at Portland, Ore., to proceed to Chicago for duty. May 9, 1891.

P. A. Surgeon G. M. Magruder, detailed as recorder of Board for physical examination of candidates for appointment, Revenue Marine Service. May 9, 1891.

Asst. Surgeon A. W. Condict, relieved from duty at Chicago, Ill.; ordered to Portland, Ore. May 9, 1891.

Asst. Surgeon H. D. Geddings, to proceed to New York on special duty. May 9, 1891.

Asst. Surgeon B. W. Brown, to report to commanding officer, Revenue Str. "Rush," on the 14th inst. May 7, 1891.

Surgeon H. W. Austin, detailed as member of Board of Examiners, Marine-Hospital Service, April 21, 1891. Detailed as chairman of Board for physical examination of officers and candidates, Revenue Marine Service, April 29, 1891.

Surgeon John Godfrey, detail as member of Board of Examiners revoked. April 21, 1891.

Surgeon Fairfax Irwin, detailed as recorder of Board for physical examination of officers and candidates, Revenue Marine Service. April 29, 1891.

P. A. Surgeon P. M. Carrington, to proceed to Fernandina and Jacksonville, Fla., as inspector. May 1, 1891.

Asst. Surgeon W. G. Stimpson, when relieved, to proceed to Savannah, Ga., for temporary duty. May 2, 1891.

Omitted from Previous List:

Asst. Surgeon B. W. Brown, detailed as medical officer, Revenue Str. "Rush," duritg summer cruise. April 14, 1891.